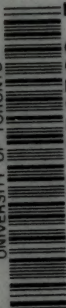
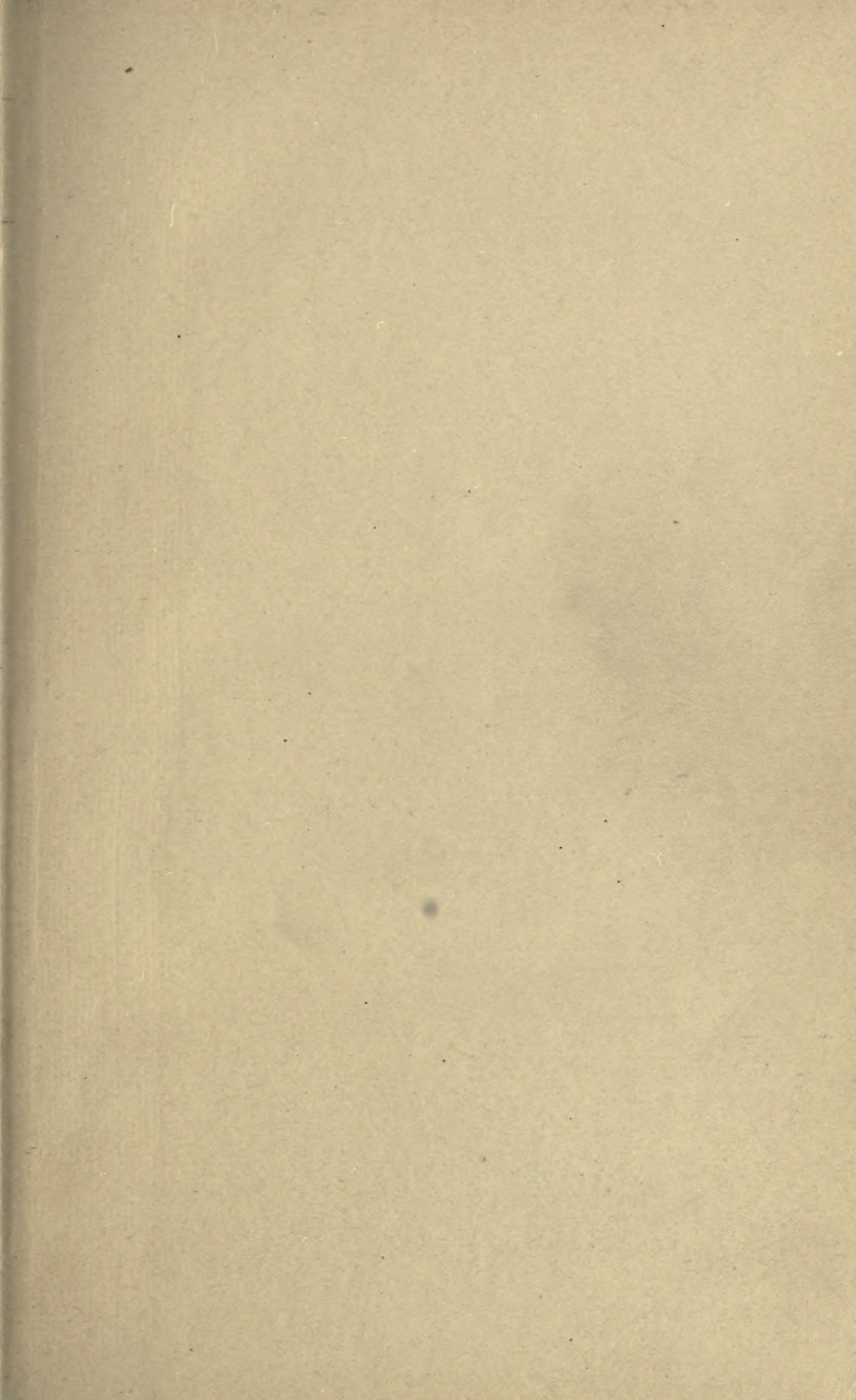


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REGIONAL MINOR  
SURGERY

DESCRIBING THE TREATMENT OF THOSE CONDI-  
TIONS DAILY ENCOUNTERED BY THE  
GENERAL PRACTITIONER.

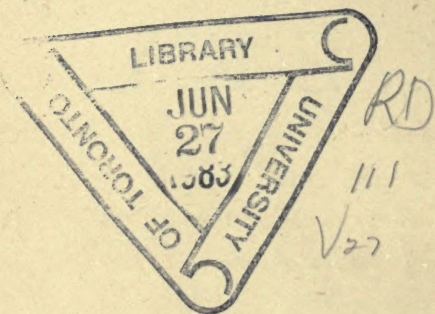
BY

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## PREFACE.

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In writing this little volume, it has been the aim to avoid subjects of a technical character as far as possible, for it was rather intended to describe the lesions coming under the heading of minor surgery and their treatment, than to give directions for procedures with which every advanced student is familiar. No bibliography has been given, and very few references to other writers, both for brevity's sake and because, with very few exceptions, these pages represent the result of personal observation during eighteen years of considerable work in dispensaries and private and hospital practice. During these years the writer has become more and more impressed with the importance of minor surgery. This term, while a useful one from the standpoint of a rough classification, must in other respects be considered an improper one. Minor surgery is minor in name only, since the most trivial injury may be followed by disastrous results, and the only way in which to treat it is according to the same laws



## PREFACE.

which hold good in the case of the greater achievements of modern surgery. Much of this work is in the hands of the general practitioner, who will be judged more often by his results with an injured finger than by those which he achieves with so much arduous labor in internal medicine and obstetrics. He must, therefore, feel competent to do minor surgical work in an aseptic, anatomical and practical manner. With this little book the writer has sought to help him in this direction.

GEORGE G. VAN SCHAICK.

November, 1902.

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## ASEPSIS.

From the surgical standpoint, no unsterilized object is clean, and the necessary corollary of this proposition is that none but sterilized objects must ever be allowed to come in contact with a wound, or with a surface about to be wounded. The simplest way of disinfecting instruments is by dipping them for at least twenty minutes in boiling water. Cutting instruments, whose edges are blunted by boiling, should be placed in pure carbolic acid for a few minutes, and then washed off in alcohol, being handled with a pair of forceps. All dressings may be boiled, unless a steam sterilizer, or one of the formalin sterilizers, is at hand. Absorbent cotton need not be boiled, unless it is to be placed in contact with the wound, as when used for sponges. When used as a protective for dressings, the wound is first covered with a sufficiency of sterilized gauze, which is then covered with the cotton, which acts both in preventing mechanically the access of bacteria to the wound, and in absorbing discharges. There are three principal ways of cleaning the operator's hands, each one of these being preceded by a thorough scrubbing with soap and a nail-brush, lasting for at least twenty minutes, in warm water.

1. The hands and forearms, including the elbows, are washed in a strong solution of permanganate of potash, until they become strongly colored. They

## REGIONAL MINOR SURGERY.

are then washed off in a nearly saturated solution of oxalic acid, which decolorizes them, and are then dipped in a solution of bichloride of mercury, 1-1000.

2. Take equal quantities of chloride of lime and carbonate of soda in the hands, and moisten the mass, with which the hands and arms are scrubbed. This mixture evolves nascent chlorine, which gives a sensation of warmth. Then wash off in the 1-1000 bichloride solution.

3. Dip the hands for ten minutes in 95 per cent. alcohol, then wash off in the bichloride solution.

Each one of these methods, if conscientiously carried out, will result in hands either totally aseptic or containing so few germs that the danger is very small.

The use of rubber gloves in operating is of some advantage, as they may be thoroughly boiled, and when the hands are sore the soap and water scrubbing alone need be carried out in full, as the other sterilizing methods, if very frequently used, are often very irritating to the skin.

In regard to ligatures, the writer believes that several firms in this country prepare reliable suture materials, and that it is seldom advisable for the surgeon to sterilize his own, unless he has great facilities. In emergency, sewing or other silk may be boiled for a half an hour.

Before operating on a patient his skin should be sterilized. Here we are usually unable to use as energetic measures as with the hands. Prolonged scrubbing with soap and brush, followed by 1-1000 bichloride solution, and then with alcohol, is generally sufficient. The application of a large wet dressing of the bichloride solution, for a number of hours before the operation, is an excellent plan.

In the presence of an accidental wound, the surgeon

## ASEPSIS.

should invariably do his best to disinfect it before closing it. Copious washing out with normal saline solution (salt 8, water 1000) through a douche bag or by pouring it from a vessel, held as high above the wound as possible, is an excellent measure. The use of peroxide of hydrogen is also very effective. The 1-1000 bichloride solution, and solutions of any of the accepted antiseptic agents, may all be used.

If a recent wound is known or supposed to be infected, more stringent measures are to be adopted. As cauterizing agents the writer believes that solutions of chloride of zinc (grs. 20-30 to 3i) or permanganate of potash (1-200) are most effective. Nitrate of silver, as a cauterizing agent, is worse than useless, as it has absolutely no deep effect. If the wound is punctured, it had best be enlarged, made to bleed, and thoroughly cleaned out. Cauterization which is not done very soon after the infliction of the injury, as in dog-bites, is useless excepting in quieting the patient's fears, which are commonly imaginary. The reason is that absorption takes place so rapidly in the tissues that the poison is soon out of reach of the cauterizing agent.

Special applications of aseptic rules will be considered as they arise in the course of this work.



## REGIONAL MINOR SURGERY.

### SUTURING.

The proper mode of applying stitches to cutaneous wounds will next be discussed. Strange as it may seem, there are ten surgeons who can do an operation successfully for every one who closes his wounds neatly and efficiently. In both principle and practice the matter is a very simple one, and the writer believes that it is on account of this very simplicity that it is so much neglected. In minor surgery neat stitching, as in the case of a wound on a lady's face, is often of very great importance, not as a matter of life and death, but as affecting the surgeon's reputation for doing good work.

An incision running in a straight line is the easiest to sew, but even in these poor stitching is often seen. The principle to be followed is that the direction of the stitch should be exactly at right angles with the lines of incision, but there is often a tendency to bring out the needle at a point which is not exactly opposite to the point of entrance, especially if the lips of the incision separate widely. In these cases it is often well to pull the angles of the wound apart with the thumb and forefinger of the left hand. This brings the lips in apposition, and allows of more accurate stitching.

Angular wounds should always be stitched as follows: Introduce the needle in the portion of skin forming the angle, in such a manner that the line of

## SUTURING.

the needle bisects the angle, and bring it out in the same way. Tie the suture, and two linear incisions remain, which are to be stitched at right angles to the lips.

Curved incisions are often very badly stitched, for the reason that the surgeon is very apt to treat them as straight incisions, placing his sutures at right angles with a line running between the ends of the wound. The result of this procedure is that more skin is taken up on the concave than on the convex

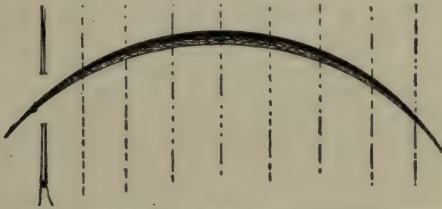


FIG. 1. Wrong way of sewing a curved incision.

lip, and that there will be a bulging on the concave side, as shown in Fig. 3a. The principle upon which curved wounds should be sewn is that the shaft of

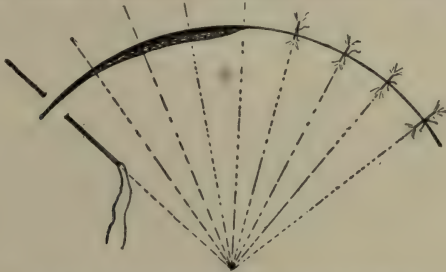


FIG. 2. Right way to sew a curved incision.

the needle should take the direction represented by the radius of the circle of which the wound forms part of the circumference. Fig. 2 shows this distinctly. A wound with a double curve is to be treated

## REGIONAL MINOR SURGERY.

From an aseptic standpoint we are never justified in placing adhesive plaster directly upon a wounded surface. In order to avoid this the surgeon cuts two pieces of plaster to correspond with the size and shape of the wound. The ends nearest the wound are doubled under, and stitches are passed through the doubled ends. The plaster is then applied in the same way, making the radii correspond with the direction of the curves.

There are two other ways of bringing the edges of incisions together, both of which are often conveniently used when patients object to stitches, or when the cut is small and has little tendency to gap. These methods depend upon the use of 1, adhesive plaster and 2, collodion.



FIG. 3. *a*, Result of wrong stitch. *b*, Result of proper stitch.

to the skin, from at a quarter to a half inch from the incision. A piece of aseptic gauze is placed on the wound, and the sutures are tied over the gauze, with sufficient tension to bring the edges of the incision together. This method has the advantage of requiring no needle holes, and is consequently painless. It also allows the wound to be inspected by loosening the tied ends.

The collodion method is applied by placing one end of a thin layer of absorbent cotton on one side of the wound, and painting it over with collodion until it



## SUTURING.

adheres firmly to the skin. The loose end of cotton is then pulled over the wound, with sufficient tension to bring the edges together, and is fastened on the other side as before.

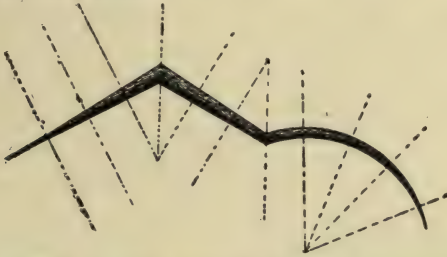


FIG. 4. Showing direction of sutures in a wound combining straight lines, angles, and a curved line.

These last two methods are not to be considered as more than makeshifts that are often serviceable. Where much tension exists, or when the wound is large, nothing but stitching will do.

## REGIONAL MINOR SURGERY.

### THE HEAD.

*The Scalp.*—Every variety of wound may be observed on the scalp, the special anatomical conditions of which must be considered in the treatment of its injuries. Its great thickness, as compared with the skin elsewhere, its position over a hard bony surface, the presence of underlying layers of muscle or aponeurosis, and its great supply of bloodvessels independent of those which nourish the tissues beneath it, are important factors in determining the mode of action best adapted to the treatment of its traumas and other pathological conditions.

The great majority of wounds of the scalp are practically incised wounds, for the reason that blows inflicted upon it by blunt instruments cause a longitudinal splitting in a large number of instances, owing to its being stretched over a hard surface which makes it unable to yield to the effects of the blows. Such wounds are always contused as well as incised, but the contusion is of no great practical importance owing to the great recuperative power due to the vascularity of the scalp.

These wounds are seldom dangerous, excepting in regard to persistent bleeding, and the ever present possibility of suppurative and other septic conditions.

*Incised wounds* first confront us with the problem of stopping hemorrhage. In many cases this will be nearly insignificant, and in others it soon ceases

## THE HEAD.

spontaneously. The thickness of the scalp, its toughness, and the fact that the vessels are imbedded in its substance, cause a peculiar difficulty in seizing and tying the bleeding points, and in the presence of abundant bleeding we are commonly compelled to use compression by means of ligatures or hare-lip pins passed through the scalp and beneath the vessel. The larger arteries of the scalp often bleed profusely because they are unable to retract, owing to their having been but partially divided. Complete section of the vessel by the surgeon often suffices to stop the flow of blood.

*Asepsis* is of the utmost importance, and demands much care. The hair is naturally somewhat oily and often artificially so. Countless noxious organisms may adhere to it. The cleansing process must, therefore, aim to dissolve away the grease and wash it off thoroughly. It would naturally be a great advantage to completely shave off the hair in all wounds of the scalp, but in practice we are seldom permitted to do more than denude a limited area. This having been

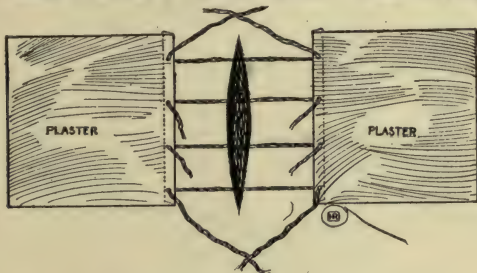


FIG. 5. Combined adhesive plaster and suture.

done, the whole surface should be vigorously scrubbed with ether, alcohol, or, better still, with 7 parts of alcohol to 1 part of acetic acid. The wound must be profusely irrigated, and every particle or dirt, hair,



## REGIONAL MINOR SURGERY.

etc., should be carefully removed. It is better to use plain boiled water, or saline or Thiersch's solution than any of the toxic antiseptics. The writer believes that the mechanical effects of the washing out are more important than the action exerted by the so-called antiseptics.

*Approximation* of the divided edges follows. If the wound is small and there is no gaping, suture is often unnecessary. Gaping varies according to the location of the wound. If the latter is situated perpendicularly to the axis of muscular or aponeurotic fibres, it will gape more than if parallel to them. Every gaping wound should be sutured, unless we feel pretty certain that, in a particular case, we will not be able to obtain an aseptic result. The stitches should be as few as are compatible with fair approximation, and should never hold tightly together the angles of the incision. This might prevent necessary drainage. In case of apprehended sepsis, always place drains of horse-hair, silkworm gut, silk, or gauze in strips, and suture over them, leaving

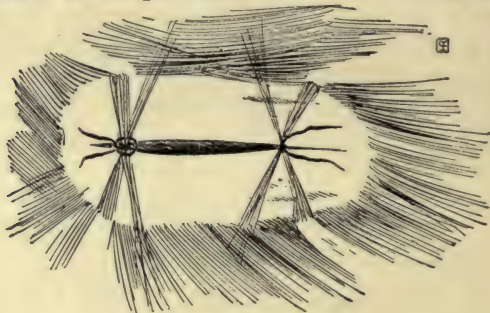


FIG. 6. The hair suture.

plenty of room at the angles. Silkworm gut is an ideal suture material, excepting that where it is doubled at the eye of the needle it often presents so

## THE HEAD.

wide a surface as to enter the tough scalp with difficulty. Well boiled silk of moderate size, or small catgut, is therefore usually preferable, as they can be introduced with a much smaller needle. Remove the stitches early.

Small wounds of the scalp may be approximated by the use of the combined adhesive plaster and suture, as previously described and shown in Fig. 5. They can also be united by drawing two small locks of hair over the wound and tying them together, as shown in Fig. 6. The latter is seldom advisable, excepting in very small wounds, or where the patient absolutely forbids the use of stitches, for the reason that it is not a very aseptic method.

*The Dressing* follows; it must be abundant enough to absorb all discharges and to enable a fair amount of pressure to be applied, and it must readily take up all fluids secreted. An aseptic wound always does best under a dry dressing, providing the latter is readily penetrable. This cannot be realized in an absolutely dry dressing, and the addition of a little glycerin, or boro-glyceride, is a distinct advantage. It promotes absorption by its affinity with watery fluids, and prevents adherence of the dressing to the wound, a distinct advantage when the latter is situated upon hairy parts. Never use any of the toxic antiseptics, as the scalp is often peculiarly susceptible to their action, and dermatitis of varying degrees of severity is often caused by them. The bandage must be put on with great care, and in the case of insane and drunken people, who are likely to pull it off, should be fastened with especial precaution. A starch, plaster or water glass dressing is most effective in such cases.

*Contusions* of the scalp seldom require much at-

## REGIONAL MINOR SURGERY.

tention. Gentle massage and the use of cooling lotions are frequently of benefit. There is usually some extravasation, ranging between an insignificant amount and a large hæmatoma. These collections should never be touched unless there is evidence of sepsis, when they must be opened, evacuated and washed out like other septic collections.

The presence of extravasations occasionally give rise to the erroneous diagnosis of depressed fracture, as the swelling is usually somewhat circular with a soft center which suggests a piece of bone lying lower than the surrounding parts of the skull. In fracture, however, the finger first meets a ridge which is not raised above the surrounding bone, whereas in extravasation it is distinctly so raised. Steady pressure on the ridge will also cause no pitting in fracture. The absence of the symptoms of compression should also point out the true state of affairs, but in practice it is found that some of the best surgeons have erred in the diagnosis. In case of doubt, therefore, it is proper to incise in order to reach an accurate conclusion. Hæmatomata, which increase in size and pulsate, must be incised, the vessel is to be tied, and the strictest antiseptic measures must be adopted.

*Lacerated Wounds* are in most respects to be treated in the same way as incised ones. Never sacrifice any portions of the scalp unless they are absolutely beyond the possibility of repair. Pieces that have been entirely detached may be confidently expected to grow on again under careful asepsis, in many of the cases.

In some instances the pericranium is stripped off, but this accident seldom leads to exfoliation of the bone. Granulation tissue is soon formed and nearly always covers the bone most efficiently. If the peri-



## THE HEAD.

cranium still adheres by a flap it should be replaced with great care.

Sepsis may occur before the patient has seen the surgeon, or in spite of the latter's efforts at prevention. If a septic case is seen for the first time clean everything with pure peroxide of hydrogen, establish thorough drainage, and treat under a frequently renewed wet dressing, kept thoroughly moist with saline solution under a covering of rubber protective. Owing to the fact that its vessels lie above the tissues that are the seat of inflammation, the scalp has little or no tendency to lose its vitality in the presence of sepsis, its blood supply continuing unimpaired. As the pus has a tendency to burrow under the scalp, often to an amazing extent, incisions may have to be enlarged, and other openings for drainage have to be made, through which drainage tubes should be passed.

Rise of temperature and some local pain are commonly the symptoms which lead the surgeon to suspect the onset of a septic process. Owing to the thickness of the scalp, two most important indications of inflammation elsewhere, to wit, swelling and redness, are apt to be entirely absent, or very nearly so. This fact must not induce a false sense of security; pain, heat, and the slightest sensation of fluctuation, are a signal to remove every stitch at once, to thoroughly flush the wound, establish drainage and put on a large wet dressing. Too much can hardly be said against the old poultice, which filthy and ineffective device is still not without honor in some places.

Of other forms of sepsis, the most important are tetanus and erysipelas, which is often apt to develop a phlegmonous character. The first of these is so little amenable to treatment, as yet, that we will not

## REGIONAL MINOR SURGERY.

consider it here, excepting for the statement that antitoxine probably offers the best chances of obtaining a cure.

Erysipelas may arise from the merest abrasion of the cutaneous surface, as well as complicating important wounds. There is usually a tendency to some sloughing when it affects large wounds. Multiple incisions are often of value, and the application of ichthyol in a ten per cent. ointment, or even a little stronger, appears to control the process rather better than any other substance with which the writer is acquainted. General treatment is necessary, consisting of tonics, among which quinine and iron are the best, with milk diet and the occasional use of laxatives. The process may sometimes be limited by painting the surrounding areas with iodoform colloidion. Prophylaxis may only be accomplished by means of thorough aseptic treatment. When dirt is so ground into the tissues that it cannot be washed out by irrigation and scrubbing, it is an excellent plan to touch all the dirty spots with a ten per cent. solution of chloride of zinc.

## THE FACE.

In elderly people, small tumors of the face, usually termed cancrroidal growths, sometimes occur. They often appear like slightly ulcerated papillomata, and pathologically, must usually be considered as papillomata, or warts, with a tendency to cancerous or epitheliomatous degeneration. They frequently last for years, having for a long time a decidedly benign development. Such tumors should never be cauterized or merely snipped off, as these measures afford

## THE FACE.

the surest way of causing a rapid onset of malignancy. These tumors should either be left severely alone, while carefully watched, or else they should be thoroughly removed with the knife, the incision including much of the surrounding and deep tissues.



## REGIONAL MINOR SURGERY.

### THE EYE.

The eyeball may be subjected to contusions and wounds of all degrees of severity, penetrating and non-penetrating. Very serious injury may result from either of these forms.

Injection of the conjunctival vessels and even hemorrhage within the anterior chamber often occur from non-penetrating blows, and are to be treated by atropine and slight pressure under a bandage. Rupture of the eyeball is always attended with hemorrhage into the vitreous and anterior chamber, and there is practically always a great reduction in the tension of the eyeball. Dislocation of the lens and traumatic cataract may result from blows, etc. These conditions should always be treated by the application of mild antiseptics, bandaging, and reference to an ophthalmologist.

In penetrating wounds, if seen early, and there is prolapse of the iris, the latter may sometimes be replaced with a spatula. If the wound is central, atropine is instilled, while eserine is used if the wound is peripheral. When the iris has already formed attachments it will have to be drawn out and excised, or else atropine and pressure must be employed. In incised wounds of the cornea it is advisable to stitch up the wound, if not too extensive, and in the absence of infection. But if the sight is lost, and particularly in the presence of sepsis, enucleation is necessary in a large number of cases.

## THE EYE.

*Foreign bodies.* Lime is sometimes splashed in the eye, and the first thing to do is to wash it out thoroughly under a stream of water, after which it is well to use an oily substance. Any bland oil is serviceable in an emergency. If the burn is extensive there may be a tendency to adhesion between the lids and the cornea. This is prevented by the use of a small sheet of gold-beaters' skin placed between the surfaces, and by frequent dressings and inspections. Grains of powder may be removed with a spud or needle. Hard particles lodge under the lids or penetrate the cornea, remaining attached to it. The inspection should be absolutely thorough, since these bodies are often quite difficult to discover. It is well to use a magnifying glass, with both the oblique and direct light. If no magnifying glass is at hand, we can often borrow a pair of magnifying eye glasses from some elderly person, and by doubling the glasses get a considerable degree of enlargement.

An applicator around which a little cotton has been wound is usually all that will be necessary for the removal. If deeply imbedded, the offending body may have to be removed with a spud. This should be sterilized. A little cocaine is used.

Foreign bodies in the anterior chamber, or caught up in the meshes of the iris, or imbedded in the lens, or within the globe, all require the services of a competent oculist.

Injuries and burns of the lids offer nothing very special.

*Diseases of the lids.*—Abscess requires the same treatment as do purulent infections elsewhere. Styes are suppurative infections of the margin of the lids. Attention to the general health, and the correction of

## REGIONAL MINOR SURGERY.

possible visual errors, should be attended to in people in whom styes show a tendency to recur frequently. The treatment consists in the use of boric acid washes, the application of the ointment of the yellow oxide of mercury, and early incision.

Blepharitis is an inflammation of the ciliary border, most often seen in the scrofulous, or as a result of eczema, or when due to the presence of pediculi among the eye lashes. The treatment, except in the last case, is commonly constitutional, together with the use of mild antiseptics. In some cases astigmatism appears to favor the production of blepharitis, and must be corrected by glasses.

*Granular Lids.*—Granular lids result from chronic irritation and inflammation. These disturbances are often due in great part to constitutional causes, as in the case of strumous children. The treatment consists in cauterizations with silver nitrate, sulphate of copper and other similar mild caustic substances, followed by the daily use of collyria, containing a small proportion of sulphate of zinc or nitrate of silver, or of one of the other silver preparations. Cod-liver oil and iron or arsenic form the basis of the internal medication.

*Trachoma.*—This might be called an exaggerated form of granular lids, in which there is the formation of what are known as trachoma bodies. These tend to increase in number, until they crowd one another, and form a surface so rough and inflamed that the pressure they cause is apt to result in ulceration of the cornea. In the milder forms the use of the caustics mentioned above is sometimes sufficient, but in severe cases operation must be resorted to. The latter, consisting in expression of all the granulations and lymphoid infiltration, must be done with a degree



## THE EYE.

of thoroughness such that this little procedure, as done by the best ophthalmologists, appears to one unfamiliar with the subject unnecessarily harsh and brutal. And yet there is no middle ground, for unless it is thoroughly done, the operation will prove insufficient. General anæsthesia is necessary, after which the lids are everted, and the whole surface is thoroughly gone over with an instrument such as Dr. Knapp's expression forceps, in which small rollers are made to forcibly squeeze out every bit of granulation and lymphoid material.

*The conjunctiva.*—The conjunctiva may be simply irritated by dust, the influence of strong wind, exposure to strong light or heat, or as a result of the effects of irritant liquids or gases, or owing to constitutional defects. This irritation may be of all degrees of severity.

The treatment consists in thorough cleanliness, the use of astringents or caustics, the exclusion of strong light, and constitutional remedies.

When conjunctivitis is due to a virulent form of sepsis, as in the gonorrheal form, every effort must be made to protect the adjoining eye, if still unaffected. In that form which affects the new-born, the treatment consists in the constant application of ice cold compresses, or of compresses kept very hot, at least 120°. The eye should be irrigated several times every hour with mild antiseptic solutions, and, once or twice a day, must be thoroughly swabbed out with silver nitrate, ten or twenty grains to the ounce. In gonorrheal ophthalmia occurring in adults there is practically no difference in the treatment excepting that it may be made even more thorough. In any of these bad infectious cases, any relaxation of constant care, night and day, is likely to result in loss of the eye.

## REGIONAL MINOR SURGERY.

### THE EAR.

*Incised wounds* of the auricle, owing to the profuse vascularity of the part, heal with great facility. After thorough cleansing the cut edges are to be united with silk sutures, and, unless the wound is very large, causing considerable secretion, sealing it with collodion is advisable. In some small clean wounds the application of gauze strips dipped in collodion may well take the place of sutures.

Parts of the auricle that have been completely severed should be carefully cleansed in saline solution, and replaced with stitches, if this may be done within a reasonable time after the infliction of the injury. The prospects of union are good.

The lobule is sometimes torn, especially in women, whose earrings are occasionally torn out by thieves, or during quarrels. Cleft lobule may be partial, a long slit existing, which is due to the effect of heavy earrings. In either case suture, with or without paring of the edges, according to the condition of the surface, will remedy the condition.

Contused wounds are commonly of no importance, unless followed by hæmatoma. Lacerated wounds heal readily, after thorough aseptic measures.

*Hæmatoma* of the ear is an extravasation of blood, lying over or under the perichondrium. It occurs rapidly, as frequently happens in prize-fighters, after the infliction of a blow upon the ear, but there is

## THE EAR.

evidence that it also takes place independently of traumatism. It is especially frequent in the insane, and we doubt that the explanation that they are peculiarly subject to violence accounts for all the cases. The writer believes that some persons, whose general health is run down, are subject to attacks of perichondritis followed by hæmatoma auris. Hæmatoma from violence is sometimes followed by sepsis of the effused material, followed by pain, redness, swelling, and the formation of pus. The treatment is by incision of the whole length of the tumor, prolonged irrigation with saline solution, thorough cleansing with peroxide of hydrogen, and daily dressing. The application of weak solutions of nitrate of silver or protargol hastens the process of repair, after granulation has begun.

Aseptic hæmatoma may be incised in the same way. Unless the incision is a liberal one, allowing all the contents to be thoroughly washed out, sepsis is very likely to occur. It is generally best not to stitch the wound, but to allow it to heal under a careful aseptic dressing.

The same treatment is to be adopted in those cases which appear to be due to a chronic perichondritis.

Sepsis resulting from wounds usually gives way rapidly to antiseptic treatment. Erysipelas necessitates the treatment described under erysipelas of the scalp.

There is a condition which occurs in children with chronic eczema of the auricle, which much resembles erysipelas. During the course of a chronic eczema there is an attack of pain and general swelling, during which the skin assumes the vivid red hue of erysipelas, but the trouble ordinarily lasts but four or five days, after which it rapidly subsides. Cooling applications are of advantage.

## REGIONAL MINOR SURGERY.

*Diffuse inflammation* often results from too vigorous poulticing, or as a consequence of scalding or freezing. Portions of the skin often fall off, but are usually soon replaced over granulations. Actual gangrene resulting from cold occurs at times, when the gangrenous parts must be trimmed off. This condition is often due to too rapid attempts at thawing out a frozen ear. It should be rubbed first with snow, then with cold water, and only later with tepid water. The patient should wait for several hours before going into a room with a high temperature. Care must be taken in rubbing that the frozen ear is not broken off, as has occasionally happened. An eczematous condition often follows frost-bites, and is to be treated with a soothing ointment.

*Foreign bodies* introduced within the auditory canal must be removed as soon as possible, but the surgeon should invariably examine the ear carefully first. Children have been greatly injured by attempts made to extract a body which had already fallen out, or whose presence only existed in the child's imagination. Foreign bodies have caused inflammation going on to meningitis and death. Unless easily grasped with forceps, prolonged syringing with a fountain syringe is usually most successful. Failing this, we may attempt its removal with forceps, currettes or hooks. Pins bent at various angles and held in an artery forceps are often useful. Maggots and other insects occasionally are found within the meatus. They are very difficult to remove while in motion. Hold a bit of cotton or gauze saturated with chloroform over the meatus. Some of the maggots will attempt to escape by issuing from the meatus, when they may be removed, while the others will be anæsthetized or killed, and may easily be seized through a speculum.



## THE EAR.

Plugs of cerumen should be submitted to prolonged irrigation with tepid alkaline solutions, and be carefully removed with curettes. This often necessitates several treatments.

A septic condition sometimes occurs around the mastoid process, known as peri-mastoid abscess. The appearance of the patient, and his sufferings, often resemble those seen in advanced mastoid cases. But distinct fluctuation under the skin reveals the true nature of the disease, which must be treated by free incision and drainage.

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### THE NOSE.

Here again the vascularity is so great that, with asepsis and proper approximation, wounds of all kinds give wonderfully good results. Incised wounds must be sutured, usually with fine silk, unless they are small enough to allow of the edges being kept in position with a collodion dressing. Lacerated wounds must also be sewed, after thorough cleansing. Noses that have been entirely separated should be carefully sutured back in position, if this may be done within a reasonable time. Hoffacker, in India, did this successfully in a number of instances, as late as an hour or more after the infliction of the injury.

*Contusions* give rise to a great deal of swelling, and the surgeon must examine the parts with the greatest possible care, in order to decide whether any fracture or displacement of the bones or cartilages has taken place. It is often impossible to decide the matter at once, however, and the first indication is to reduce the swelling as soon as possible. Hot fomentations are best for this purpose.

*Hæmatoma* may take place, although it is not very common. It affects the septum, and as it usually blocks up one or both nostrils, and is peculiarly liable to septic infection, it will have to be opened, cleaned out, and frequently washed. The fact that it may complicate fracture usually makes no difference in the propriety of this treatment, because the presence of

## THE NOSE.

the tumor prevents proper reduction in most instances, and the chances of avoiding sepsis are better under the open treatment.

*Fracture* is common. It occurs most frequently in the lower third of the bone, and most rarely in the upper third. The treatment of broken nasal bones often demands the greatest care and ingenuity on the part of the surgeon. It must be remembered that the very slightest deviation from the original direction of the bones and cartilages will make an amazing difference in the patient's appearance. The nasal bones have no muscular attachments to contribute to the displacement, which is therefore entirely due to the force applied. This fact makes it very easy to retain the broken pieces in a proper position, if the latter has once been obtained, and, if the deformity shows no tendency to recur spontaneously, it would theoretically be best to put no splints or other appliances over the nose. In practice, however, this will not always answer, because a very slight degree of force, due to the patient's carelessness, may reproduce the displacement. It is fortunate that in simple fractures the process of repair is very rapid, as consolidation is usually effected in from six to ten days, and very little if any provisional callus is formed. If the patient can be kept indoors, or if he cares nothing for his personal appearance, and the broken bones tend to remain in place after reduction, I am in the habit of ordering the patient to wear one of the nose-masks sometimes used by football players. These nowhere touch the organ, but simply protect it from external violence. Similar appliances may readily be made out of hard rubber or with a piece of sole-leather, or even with stout card-board.

When, owing to considerable comminution, or for

### REGIONAL MINOR SURGERY.

any other reason, the fragments will not remain replaced, some sort of splint must be adopted. In many instances, a small piece of a hard woven catheter, or of glass tubing, around which gauze squeezed out of carbolized oil or vaseline is pushed up with a probe, will answer very well. If this does not prove efficient, a long sterilized pin is driven through the skin, under the broken bones, and is supported at the proper distance by means of small rolls of gauze bandage, as shown in Fig 7. The rolls are held together either

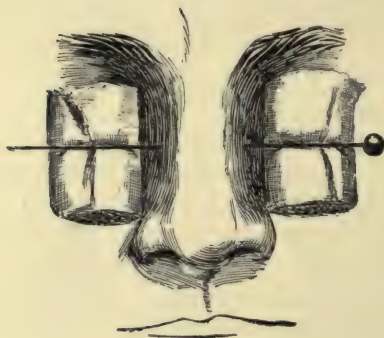


Fig. 7.

by two strips of adhesive plaster placed above and below the pin, crossing over the bridge of the nose, and the ends of the rolls, and fastened on the cheeks. Or small rubber bands holding the ends of the rolls and crossing over the bridge may be employed.

*Displacement* of the cartilages, usually of the septum, may occur independently of fracture. It is



## THE NOSE.

often very troublesome, and must be treated according to the general principles above mentioned.

It is well to beware against being misled by what might be termed a normal deviation of the septum. Treves estimates that seventy-six per cent. of noses show some degree of deviation, generally towards the left side.

In compound fracture good results are often obtained. It is at times necessary to remove some small fragments of bone. Constant cleanliness is naturally indispensable.

Replacing the fragments may sometimes be accomplished with the end of the small finger, properly disinfected and lubricated. A metallic sound may serve if the finger is too large, and if the swelling is such that even that may not enter, a grooved director or other strong steel instrument will answer. The previous application of cocaine to the nasal mucous membrane will greatly facilitate these manipulations.

When the injury has resulted in laceration of the mucous membrane, there may supervene an emphysema usually due to the entrance of air during efforts at clearing the nose. This somewhat rare occurrence, which is troublesome at the time, and favors sepsis, is best avoided or cured by strict injunction to the patient not to blow his nose, when it will rapidly disappear.

*Epistaxis.*—Nose-bleed is so common an occurrence that it is always with a feeling of surprise that we now and then see a life placed in jeopardy, and even lost, by its effects. It may occur as the result of injuries, or as a complication of the presence of neoplasms, or else, in its congestive or passive forms, owing to circulatory disturbances. Nose-bleed due to injuries, whether accidental or operative, seldom

## REGIONAL MINOR SURGERY.

proves rebellious to treatment. It occurs as a result of the driving within the nose of sharp objects, or in consequence of the laceration of the mucous membrane through the agency of blows upon the nose, with or without fracture of the bones. Injudicious attempts at removing foreign bodies, by the patient or his friends, is a fairly frequent cause. The surgical removal of neoplasms, or the performance of plastic operations, necessarily causes bleeding which is seldom dangerous excepting for the possible entrance of blood within the trachea. This is avoided by operating while the patient's head lies lower than his body.

The passive and congestive forms give us our worst cases. The latter are commonly less severe than the former, and are noticed as a result of menstrual or climacteric disturbances, as in vicarious menstruation, and in people with a tendency to increase of the general blood pressure. The passive forms are due to some change in the bloodvessels, as in purpura, or in scurvy, or to a defect in the circulation with a disturbance in the tone of the vessels, as in the so-called critical epistaxis of fevers, and as in disturbances of the heart, kidneys, and liver. Critical nose-bleed hardly ever gives rise to serious complications, and the passive epistaxis due to the other causes mentioned supplies practically all of our dangerous and fatal cases.

The character of this hemorrhage, in a bad case, is strikingly peculiar. No very large vessel is commonly involved, but it seems that all the smaller ones are contributing to the flow, which goes on persistently, ceasing at times for a few moments, to recur most discouragingly. There often seems to be not the slightest tendency for the bleeding to cease spon-

## THE NOSE.

taneously, and the more blood the patient loses, the more the flow continues. Our measures to stop the bleeding are frequently successful for a few hours, when the trouble returns as bad as ever, in spite of all that we can do. Thus some patients continue to bleed until they die, while others only cease when exsanguinated and fainting. It is therefore wise to be very guarded in the prognosis when we are called to treat such cases, and we should not become unduly elated at the apparent success of our measures, since they may prove quite temporary in their efficacy. Still, we always expect to obtain good results in a large majority of these patients.

*Treatment.*—In some cases, especially such as are due to injury, we find upon examination that the bleeding comes from a vessel that may be tied, or caught with an artery forceps, or touched with the small point of a cautery. After the removal of pediculated tumors there is often a small artery at the lower end of the stump, which may be seen to spurt, and should be tied, twisted or cauterized. In many instances the application of ice or wet cloths to the nape of the neck will suffice. Raising the arms above the head is frequently useful, as it increases thoracic expansion, and probably lessens the congestion of the cervical veins. The head should be thrown well back, while the patient sits in a chair, and the surgeon must prevent the constant blowing and wiping of the nose. Syringing with ice water is frequently successful. Never employ insufflations of astringent powders, such as alum or tannin, which, besides being very disagreeable, may induce sneezing. The use of solutions of antipyrin as a hemostatic is highly recommended. All tight clothing is to be loosened, collars should be taken off, and corsets must be removed.

## REGIONAL MINOR SURGERY.

Plugging the anterior nares may suffice if the seat of the hemorrhage is low down. When this measure is adopted always inspect the throat. If the blood continues to dribble over the soft palate, posterior plugging is indispensable. For this procedure Bellocq's sound is admirably adapted, but it hardly ever is at hand. A medium sized soft catheter, or a flexible one may be used in its place. A long ligature of strong thread or silk is attached to the end, which is then passed into the nostril, and pushed backwards and upwards until the end is seen to pass over the soft palate. It is then seized with fingers or forceps, the string brought out of the mouth, the plug attached, and the catheter is pulled back from the nose. The string is drawn until the plug is firmly engaged in the posterior nares. The anterior nares are then solidly plugged. It is a common mistake to make the posterior plug too small. In the adult the aperture of the posterior nares measures an inch and a quarter vertically, by a half an inch transversely, and the plug should be a little larger than this, since, by compression and wetting it will become somewhat smaller as soon as the string is pulled tight. It is unsafe to leave these plugs in for more than thirty-six hours, owing to the danger of sepsis. They should be removed, the whole nasal cavity well washed out, and the plugs replaced if necessary. I am in the habit of soaking the plugs in a ten per cent. solution of antipyrine, before placing them; this is much to be preferred to the solutions of salts of iron, which form a magma of filthy coagulated blood, the washing away of which is apt to favor a return of the bleeding.

*Foreign bodies* should be removed at once. The ingenuity of children in introducing extraordinary articles in their nostrils is truly wonderful. Cherry



## THE ANTRUM.

stones and other pits of fruits, peas, beans and other vegetable substances, jackstones, shoe-buttons, and small marbles are but a few among the list of articles which have been removed from their noses. The forceps will often suffice to extract these substances. For soft and friable bodies washing out and the use of the scoop will prove successful. If the body is sufficiently small it may be pushed up into the posterior nares and allowed to fall into the pharynx, the child's head being so lowered as to prevent the foreign body from falling into the trachea. For large bodies a snare or wire loop may prove of advantage. Calculi sometimes occur, and they, as well as hard foreign bodies, at times necessitate the use of a small lithotrite.

Insects may be removed by washing them out with a saline solution, or with a weak solution of vinegar, or by first exposing them to the action of a little chloroform, and removing them with forceps after they are anæsthetized or dead.

## THE ANTRUM.

The most frequent condition we are called upon to treat in connection with the upper jaw, outside of dental troubles, is *abscess of the antrum of Highmore*. This condition most frequently results from sepsis due to carious teeth, but often enough is caused by a continuation within the antrum of inflammatory conditions of the nasal mucous membrane, whether due to catarrh, syphilis, or one of the eruptive fevers.

The condition may be very acute, or may have a chronic character. If the opening of the antrum in the nasal cavity is blocked up, and there is no drain-

## REGIONAL MINOR SURGERY.

age there or along the fangs of the teeth, the swelling and pain come on with great rapidity, accompanied by the general symptoms of septic infection. If nothing is done at this time, there is a tendency on the part of the walls of the antrum to become thin, with a peculiar parchment-like feeling, most marked towards the cheek, the roof of the mouth, or the floor of the orbit, where it sometimes causes the eyeball to protrude. The abscess continues to point in these directions, and may spontaneously break through either one or both, or a flow becomes established by the side of the teeth, or else, but more rarely, it may break out into the nasal cavity, or through the floor of the orbit. None of these occurrences is apt to result in a cure of the condition, which is likely to become chronic, or to relapse in an acute form owing to the closure of the drainage openings. It must also be remembered that a certain proportion of cases might die of sepsis before a spontaneous evacuation should occur.

The first or second permanent molars are most apt to be at fault, and if decayed should at once be removed. In many instances this, with persistent washing out of the cavity, may suffice to effect a cure. In other cases, however, the fangs of the teeth do not penetrate into the antrum, and then no flow of pus follows the extraction. In such cases a drill or trocar must be forced up through the socket of the first permanent molar, in a direction slightly backward and a little outward, taking great care not to allow the instrument to penetrate deeply enough to reach the floor of the orbit. If the swelling is so great as to prevent the patient from opening his mouth sufficiently to allow the extraction, the opening, with the same instruments, should be practiced in the lower

## THE ANTRUM.

part of the carine fossa, the direction being similar to that just stated. A small chisel may sometimes be required. If the teeth are perfectly sound, and the patient refuses to allow the surgeon to extract one of them, the abscess may be evacuated through the roof of the mouth, with a strong bone scalpel or a trocar, at the point where the swelling is most marked and converts the normal concave form into a decided convexity. In order to obtain a perfect drainage several of these methods may have to be combined in the same patient, as in case the canine opening has sufficiently reduced the swelling to allow of subsequent extraction of decayed molars and draining through the sockets.

In chronic abscess large openings are often necessary, with breaking through of the partial bony septa coming from the antral walls, which may interfere with drainage, and cleaning out of the cavity with scoops and other instruments.

Tumors of the antrum are often of a malignant nature. They grow much more slowly than abscesses, and are not, at least at first, attended with so much pain. Their treatment belongs to the domain of major surgery.

## REGIONAL MINOR SURGERY.

### THE LIPS.

*Injuries to the lips* hardly need special attention. They are quite frequent, since blows upon the mouth often result in laceration against the teeth. Hemorrhage is rarely severe, and may be stopped by compression of the coronary artery between the finger and thumb. This vessel runs around the mouth very near the mucous membrane, and about a third of an inch from the edge of the lips.

*Diseases of the Lips* come, even more frequently than their injuries, under the observation of the surgeon. They are subject to all the diseases which affect the skin and mucous membranes in general, and are especially affected by certain pathological processes which must be briefly reviewed. These are cancrum oris, syphilitic affections, and cancer.

*Cancrum oris*, or noma, is an affection of childhood, characterized by a phagedenic process, having a tendency to rapidly progress to a fatal end. It is peculiar in that it commonly gives rise to very little constitutional disturbance until a late period in the march of the disease. It is attended with a gradual destruction of the tissues, which takes place rapidly, the sloughs having a peculiar dryness of appearance. It is often a sequel of the more severe infectious diseases of childhood, but may occur in children who appear to be in flourishing health.

It may first appear on the lips or cheeks, in the



## THE LIPS.

form of a brownish induration in the middle of which soon appears a dry slough. Noma of the vulva runs a similar course. Prompt treatment saves a certain number of the children thus affected. Removal of all the tissue affected, the use of caustics, and persistent antiseptic measures, form the basis of the treatment. When the disease affects the mouth children swallow much of the putrid discharge, and this in itself is an important factor in affecting the general health. Frequent washing out of the mouth is indispensable. Peroxide of hydrogen or weak solutions of permanganate of potash are recommended. The steady use of chlorate of potash is not advisable, owing to its possible bad effects upon the kidneys.

*Syphilis* may affect the lips primarily or as a remote result of the specific infection.

*Chancre* of the lip comes under the observation of all who see many cases of venereal diseases. It is frequently mistaken for other affections until it reaches its full development, and it is very certain that in some instances it runs so mild a course, appearing as a simple fissure or excoriation of short duration, that syphilis may be fully established before any suspicion of the character of the lesion is aroused. As a rule, however, it goes on to full development, being situated either on the inner or outer border of the lip, or on the cutaneous tissue adjoining it. There may be more or less enlargement of the neighboring glands, even in those cases in which the chancre itself is hardly distinguishable as such. A distinct chancre presents well-marked induration, as elsewhere, producing an eroded sore of typical appearance.

Remote syphilis of the lips is of interest owing to the possibility of mistaking it for a cancer. It occurs

## REGIONAL MINOR SURGERY.

under the form of syphilides or of gummata, or of an hypertrophic infiltration. The mode of beginning of the lesion is of importance in differential diagnosis. Cancer practically always begins as a quite superficial nodule or ulceration, sometimes appearing at first as a mere crack, whereas syphilides of the ulcerative variety have the peculiar appearance of syphilides elsewhere, and are seldom limited to the lip alone. The gummata first appear as rather deep-seated lumps, and the hypertrophic infiltration invariably affects other parts of the face. Syphilides, in the stage of tumefaction, produce, when affecting the nose and lips, a remarkable degree of hardness, that has been described as nearly cartilaginous.

*Cancer* first arises in the mode just referred to, and has a tendency to steady progression. It is first a small indurated ulcer, or a mere fissure, or a small growth appearing like a wart, or a little hard patch in the mucous membrane, any of which may exist for a very long time without giving much annoyance to the patient. This tendency to slow growth is one of the chief differential signs between this disease and syphilis.

It is well to remember that, when employing mercury or the iodides as a tentative measure for differential purposes, cases of cancer often improve temporarily under this treatment, and it will not do to decide too soon that such a lesion is syphilitic.

The operative treatment of cancer of the lip, when thoroughly and effectively carried out, is of sufficient magnitude to be out of place in a work devoted to minor surgical conditions.

*Hare-Lip and Cleft Palate.*—These two conditions will be considered together, for they often coexist,

## THE LIPS.

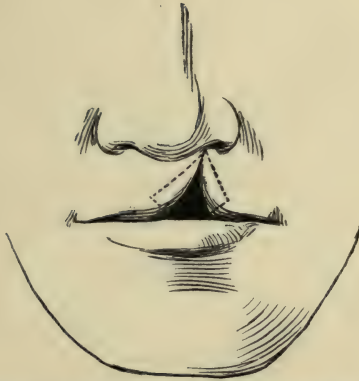


FIG. 8. Hare-lip. Dotted lines show double angular incision, to produce long line of repair, allowing for subsequent contraction.



FIG. 9. Hare-lip. Curved lines of incision, producing similar results as in Fig. 1.

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FIG. 10. Sutured line of union after operations show in Figs. 8 and 9.



FIG. 11. Hare-lip with short vertical and long diagonal flaps. Dotted lines show incision.



## THE LIPS.



FIG. 12. After incision shown in Fig. 11, the flap left by the short incision is pulled down.

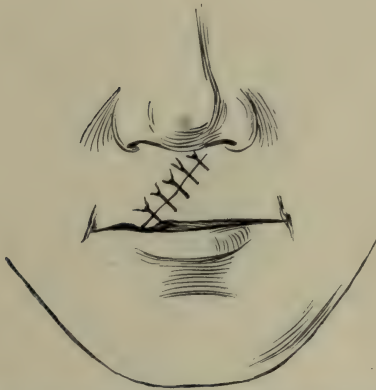


FIG. 13. Results of incisions shown in Figs. 11 and 12.

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FIG. 14. Semi-lunar incision for partial hare-lip.



FIG. 15. After incision shown in Fig. 14; the lower border at the apex of the incision is pulled down.

## THE LIPS.

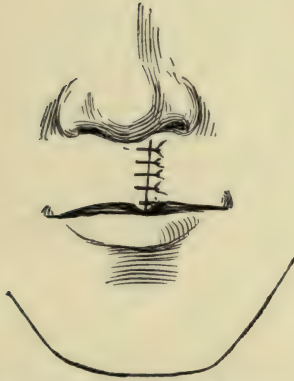


FIG. 16. The edges shown in Fig. 15 are approximated.



FIG. 17. Cleft running into nostril. Incision around ala nasi, to assist in bringing the flap to mesial line. Other steps as in Fig. 12.

## REGIONAL MINOR SURGERY.

and anatomically are due to lack of proper development in continuous regions.

Hare-lip is unilateral or bilateral, and never occurs in the mesial line of the upper lip, differing in this from cleft palate. It follows the line of suture between the os incisivum of the foetus and the superior maxillary bone, and therefore corresponds to a line running vertically down opposite the space existing between the second incisor and the canine tooth. If this lack of union should be continued backwards,



FIG. 18. Result of incision shown in Fig. 17.

the cleft runs to the median line of the palatal arch, forming cleft palate. One of these two conditions may exist independently, or both may be combined, and, in either case, may interfere with life itself, owing to the difficulty of feeding the infant. In hare-lip the child is often unable to suck, while in cleft palate there is sometimes a continuous outflow of the fluids through the nasal passages. In these cases feeding through a small catheter is sometimes necessary, but operation might prove immediately imperative. Whenever the mechanical obstruction to



## THE LIPS.

proper feeding is great, however, and the child is puny, so that his whole organism seems to partake of a condition of inferior development, early operation is seldom advisable, as the death rate is very high, not necessarily from the shock and exhaustion due to the operation, but because of the exceedingly low vitality of such infants. The chances of success improve as the child gets older, at least up to the end of the first year. This eliminates, from the surgical standpoint, a certain number of children who really are incapable of maintaining the struggle for life, and leaves patients old enough to stand the operation well, and in whom excellent results may be obtained, with scarcely any exceptions. The former tendency to operate within the first week of life is very properly, in the writer's opinion, disappearing from modern surgical methods, excepting in cases so bad that operation is the only means of obtaining a chance of saving life, and in these instances, as we have already said, the mortality is very great. The end of the fourth week is usually quite early enough.

The operative treatment of hare-lip consists in freshening the edges of the cleft with the knife or scissors, and uniting them with sutures or hare-lip pins. The most important point in the effective performance of the operation lies in the fact that the scar retracts a great deal, and that, in consequence of this, the line of union must be so devised that it will extend quite a distance beyond the border of the lip, forming a very noticeable protrusion. The writer has attempted to show this in every cut of the finished operation. The consequent retraction will bring it on a level with the remainder of the lip. The next most important point concerns the shape of the nose, which, in marked cases of hare-lip, is

## REGIONAL MINOR SURGERY.

flattened and extends laterally, on the same side as the cleft. The three indications therefore consist in: 1. Union of the cleft; 2. Exaggerated length of the line of union; 3. Restoration of the shape of the nose, if necessary.

A great variety of procedures for the accomplishment of these objects have been devised, but the most skilled operators vary their methods to meet the special indications of each case. The limits of this work do not permit of describing all these methods, some of which are illustrated by drawings, and the writer will merely indicate the mode of operating most frequently adopted by himself.

Chloroform is the anæsthetic commonly chosen, owing to its rapid action and easier administration. The minimum possible amount is used, and in very young children, while it is more troublesome, the writer prefers to operate without anæsthesia, owing to greater safety. The amount of suffering, especially with a quick operator, is really not very great, and if the child is properly held his struggles will not amount to much. In children over three months old the writer always employs chloroform. Cocaine would be effective but for the fact that it is very badly tolerated by children, and that the writer tends towards the belief that its hypodermatic use often has a bad effect upon the vitality of the tissues, thus interfering sometimes with the success of delicate plastic work.

The edges of the cleft often adhere to the gum, and a quick sweep of the knife liberates them as far up as the nasal cartilages. The edges of the cleft are then rapidly incised, in one of the ways shown in the accompanying illustrations. These incisions are all devised in such a manner that, when straight-

## THE LIPS.

ened out, they will give a line of union longer than the normal vertical length of the lip. If a flattened ala is to be remedied, the incision is carried beneath the nostril and then makes a vertical turn following the direction of the wing, so liberating the latter that it may be pushed towards the mesial line. (Fig. 17). A practiced operator can make all these incisions within a couple of minutes. In the meanwhile an assistant checks the bleeding, if necessary, by pressure with the fingers, as described when speaking of bleeding of the lips. The writer uses two forceps whose jaws do not approximate as tightly as an ordinary artery forceps, and are protected by wrapping them with a little absorbent cotton. They are applied before the incisions are made, in such a manner as to compress the upper lip on each side of the cleft. Vessels seldom need ligation.

The edges of the incisions are then united. Most operators have of late years abandoned the use of hare-lip pins, for which the writer must acknowledge a partiality, especially if there is much tension. They are very easily applied, give an excellent line of union, maintain asepsis, and are readily removed. The old method of using a figure of eight ligature over the pin, however, is advantageously replaced by fastening a perforated shot passed over the point of the pin, the part protruding beyond the pin being snipped off with strong cutting pliers. This leaves no free end to wound the mother's breast, to catch into pillows, or for the child to scratch his fingers upon. A few silk sutures should secure complete approximation.

If the ala nasi is to be drawn to the mesial line, it is sometimes found that the approximation of the lines of incision beneath the nose suffices to pull the

## REGIONAL MINOR SURGERY.

ala into its proper place. At other times a stitch or pin placed through the lower external border of the ala, and fastened to the upper end of the opposite side of the cleft, will maintain it in position. In one or two instances the writer found that he had to free the ala very thoroughly from its attachments, and to pass a pin through the lower external end of the ala or the adjoining lip tissue, then through the body of the upper lip, and out at a corresponding position in or just beyond the opposite ala. A certain amount of mechanical skill is needed in order to obtain the best results.

The writer has sometimes been consulted in cases in which the hare-lip was only partial, or where an ill-conceived operation had left a partial cleft from retraction of the scar. In these cases Nélaton's operation is often very satisfactory. A curved incision is carried, by transfixion above the vermilion border, around the cleft, in a curved line. The vermilion border is then pulled down, and the resulting lozenge-shaped gap is closed by sutures placed in a direction parallel with that of the mouth, as in Fig. 14. Here also the border of the lip is brought down to allow for retraction.

Double hare-lip requires a repetition of the operation upon the other side, or a combination of several measures.

The operation for *cleft-palate* is much more difficult, as a rule, than that for hare-lip, and the writer could scarcely encourage any one who has had no opportunity of giving special study and attention to it, to undertake it. Artificial appliances are often quite effective, and the skill of dentists and oral surgeons has produced devices which, in many instances, are most effective and comfortable. Where



## THE LIPS.

an operation is possible, however, it is better than the use of artificial palates or plates. There is no question that most patients prefer being permanently rid of this deformity, to being compelled to constantly wear one of these contrivances. The most successful operation, however, like the best devised apparatus, is often most disappointing to the patients, who expect that they will immediately lose their nasal tone of voice, and speak like every one else. This seldom occurs at first, and some teaching and practice are necessary before this may be accomplished. The extraordinary results of voice education may be realized if the reader will pinch his nose with his fingers and attempt to speak. The voice immediately becomes distinctly nasal and disagreeable. But five minutes practice will bring about a wonderful change. Open the mouth rather wide, and endeavor to form the tones in the anterior part of the mouth. The reader will find that in a few moments he may speak with very fair distinctness, and with a minimum of nasal quality, which principally affects the pronunciation of the letters M and N. In the few adults which the writer has had an opportunity of operating upon for this condition, he has found it of considerable advantage to train the voice beforehand to some extent. A week often suffices to obtain a marked change.

In young children, when the cleft through the upper jaw is of considerable extent, the bones may be brought together by wiring, or by the use of a strong suture of heavy silk, the former being preferable. The pressure of the restored lip will assist in maintaining the bones in position.

## REGIONAL MINOR SURGERY.

### THE TONGUE AND PHARYNX.

*Incised and lacerated wounds of the tongue* occur somewhat frequently. Hemorrhage is commonly very free at first, but usually ceases rapidly. Surgeons of little experience in work upon the tongue are apt to fear it rather more than its importance justifies. Amputation of at least a part of the tongue was a very common mode of punishment in the olden and middle ages, and there is evidence to the effect that most of the people subjected to it survived. Spurting vessels may be caught with artery forceps and twisted or tied, or else the application of stitches to the cut surfaces will stop the bleeding. The ends of stitches applied to the tongue should be cut as short as possible on account of the tendency on the part of the patients, especially when young, to bite and pull on them. Severe and even fatal hemorrhage occurs sometimes in unoperated cancers at an advanced period, or in recurrences where the tongue has only been partially amputated, a mode of procedure destined to disappear from our surgical methods. Such hemorrhages are often very difficult to stop; artery forceps crush through the ulcerated tissues and seldom seize the vessels effectively. The actual cautery is apt to meet with greater success. The iron preparations occasionally succeed, and the writer has seen a ten per cent. solution of antipyrine stop a very obstinate bleeding.

## THE TONGUE AND PHARYNX.

*Abscess of the tongue* is not very frequent, and, in the majority of cases, is due to the imbedding of a foreign body, such as a fish bone, within its tissues. Incision and thorough cleansing with peroxide of hydrogen, followed by frequent washing, gives the best results.

*Inflammation of the tongue*, or glossitis, is acute or chronic. In the former the disease is not often dangerous, and usually lasts but a few days. In some instances, however, the swelling is so great as to cause intense dyspnœa, and the sepsis is of so malignant a character as to cause much sloughing, which has, at times, been followed by death from infection, dyspnœa, and consequent exhaustion. The patients must be encouraged to hold cracked ice in the mouth, and should be fed on fluids. Occasionally, if the swelling is great enough to give much discomfort, incision of the tongue must be boldly practiced. A knife is carried well back, rather more than a half an inch from the raphe. It is then plunged in the tissues, to the depth of a half inch, and sharply carried well forward. The bleeding is abundant, but for a short time only, and the relief given is quite marvelous.

The chronic forms of glossitis are nearly always due to chronic inflammatory conditions beginning in the mucous membrane, and due to specific or malignant conditions, or to the various conditions generically known as chronic superficial glossitis, which include leucoma, leucoplakia, psoriasis, ichthyosis, tylosis and keratosis. These latter conditions are often very intractable, but, unless they assume malignancy, which occurs rather frequently, are of little danger to life.

*Syphilis and epithelioma of the tongue* conform much to the same affections as described above in the

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diseases of the lips. Every form of syphilitic infection of mucous membranes or deep tissues is common in the tongue.

*Epithelioma*, which occurs chiefly in old males, is one of the most common causes of the mortality from cancer, and there has always been a tendency to ascribe to it a peculiar character of malignancy. The writer, whose experience with this disease has chanced to be rather large, tends more and more towards the belief that this idea is due rather to the fact that we so often see these cases very late, than to any inherent disposition they have to assume an exaggeratedly malignant march. He also believes that early operation may give at least as large a percentage of cures as in any other region. Unfortunately most of the cases seen early are submitted to treatment by cauterizing agents, which commonly aggravate the trouble rapidly, and it is nearly impossible to persuade patients who have nothing but a rather small sore upon the tongue to submit to amputation. Most cases are, therefore, operated upon too late, and recurrences commonly take place early. The writer has had the opportunity of removing the tongue early in three instances, the patients being intelligent old men who decided upon an operation as soon as the microscopical diagnosis had been made. Of these one has had no recurrence since May, 1892, and is still alive and well; another, operated on in September, 1894, is still living, with no recurrence, and the third, operated on in January, 1895, died in March, 1899, of pneumonia.

*Papillomata* of the tongue are fairly common, and while of a benign nature, are somewhat prone to epitheliomatous degeneration.

*Angioma, fibroma* and *lipoma* are rather rare, and



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are to be treated by excision or, in the case of angioma (nævus) by the electro-cautery needle, ligature or excision of the whole tongue when large and increasing in size.

In all operations upon the tongue, in which feeding becomes a problem of importance, it is wise to accustom the patients, for several days before the operation, to wear a small, soft catheter, about 14 Fr., passed through one nostril into the œsophagus, and held in place by a tape running through openings in the end of the catheter, then passing over the cheeks, the ends being tied over the nucha. Through this fluid food may be injected with a hard rubber or glass syringe.

*Sub-lingual cyst, or ranula*, occurs quite frequently. When seen by the surgeon it is usually of somewhat recent growth, and, if at all large, consists in an indolent, soft, shiny mass of a bluish gray color. Puncture is absolutely useless, as the opening closes again. Aspiration is impossible, as a rule, because the thick, viscous albuminoid fluid contained will not run in the needle. The treatment is by partial or total removal, or the injection of cauterizing liquids. The writer is usually in favor of partial excision, with scissors, under cocaine, with cauterization by strong solutions of nitrate of silver (1-5 or 1-8), or with chloride of zinc (gr. LXXX- $\frac{3}{4}$  i) of the remainder of the cyst wall. This is necessary, and the cauterization should be thorough, for the reason that the walls contain glandular acini from which new tumors may be developed. Total excision, as a rule, is advisable only in small tumors. The injection of cauterizing agents is sometimes successful, but may produce much irritation, which, in some instances, has been known to cause œdema of the glottis. Ex-

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cision may be done so promptly and painlessly that it is by far the preferable method of dealing with these cysts.

*Hypertrophy of the Uvula.*—This condition requires operation on account of the tickling and consequent cough it so often causes. After the application of a little 5 per cent. solution of cocaine, the end of the uvula is seized with a forceps, and the uvula is snipped off. Bleeding is nearly always insignificant.

*Hypertrophy of the Tonsils.*—This condition is one of the most common throat affections. The tonsils, when hypertrophied, interfere to an enormous extent with proper breathing, and to a lesser extent with phonation. The treatment is by excision, or by producing a shrinkage of the tonsil with the cautery needle. The latter operation is recommended in cases in which hæmophilia is known to exist, or where there is such adhesion of the pillars of the fauces that the tonsil cannot well be pushed within the ring of the tonsillotome. When the operation was done with forceps and scalpel, it was considered as of greater severity than it now is, and Nelaton is said to have dreaded it more than any other surgical operation. Excision is now always done with the tonsillotome. If in a child, the hands must be secured. A little cocaine is sprayed in the throat. The instrument is passed flat over the tongue, turned vertically when the region of the tonsil is reached, and the ring is pushed over the tonsil. If this proves difficult, pressure from outside with the thumb of the unoccupied hand will usually cause the tonsil to enter the ring. The blade is then rapidly pushed forward and the tonsil is severed. Hemorrhage, though sometimes abundant for a few moments, is nearly always of no importance. In a few instances, however, dangerous and even fatal

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hemorrhage may take place. In these cases there is seldom a severe gush from the first, but rather a smart oozing which rapidly increases in volume until it reaches appalling proportions. This bleeding, as shown by the anatomical investigations of Tillaux and Chassaignac, and especially of Zuckerkandl, is never from the internal carotid. It is doubtful if this artery could be cut with a tonsillotome even if the surgeon tried his best to do so. The hemorrhage, generally due to hæmophilia or to canalization of the vessels, is derived from the tonsillar and palatine branches of the facial artery, from the descending palatine branch of the internal maxillary, and a few other minor vessels. Bleeding may be stopped by sucking ice, and by the use of antipyrine or iron solutions, or cold water. When very profuse it may require cauterization, or firm pressure, or even ligation of the common carotid. Many surgeons who have done thousands of tonsillotomies, however, have never seen a really dangerous hemorrhage, and fatal results are certainly exceedingly rare. Some cases appear more alarming than they really are on account of nervousness on the part of the patient. The surgeon must preserve a confident manner, reassure the patient, and his endeavors to stop the bleeding should be made in such a calm and quiet way as to persuade the patient that nothing out of the ordinary is taking place.

*Pharyngeal Abscesses.*—All inflammations of the pharyngeal tissues may give rise to symptoms of considerable gravity. The parts are exceedingly vascular, and there is always a possibility of extension of the process to the mucous membrane of the larynx. Abscesses arise from infection of the mucous membrane and underlying tissues, or as a consequence

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or disease of the cervical vertebræ, or by the extension of disease affecting the nares.

*Phlegmonous pharyngitis* is a destructive septic process due to mechanical or chemical injuries, or following ordinary inflammation. The neighboring tissues are much affected, and œdema glottidis often results from it.

Abscesses often arise in consequence of it, and must be opened as soon as the presence of pus is detected.

*Retro-pharyngeal abscess* occurs within the tissues lying between the pharynx and the vertebræ. It is commonest in strumous children, and is usually of a rather chronic nature. It occasionally follows some of the exanthemata, especially scarlet fever, and in such instance sometimes makes rapid progress. In some instances, as we have already seen, it is due to vertebral caries. In a large number of cases, however, we are not able to find any direct etiological cause.

The symptoms complained of are dyspnœa and dysphagia, and on examination we see a soft and fairly tense swelling at the back of the pharynx. It is round in shape, and gives a distinct sense of fluctuation. It may be exactly in the median line, but more frequently occupies a somewhat lateral position. The neck is often stiff and the head bent away from the affected side. These abscesses must be opened, and we have two methods of so doing. If we are to operate from within the mouth, the patient's head should be fully extended, in a position lower than the body, in order to avoid flooding the larynx with pus. It is advisable, if possible, to aspirate or to empty the abscess through the small trocar before practicing the incision. This operation, as we have just hinted, has



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some dangerous features, not only because the pus may reach the larynx, but also because the patient keeps on swallowing pus for some time, especially if the bones are carious, and because there is danger of severe sepsis by infection through the mouth. If there is time, and we have the facilities for a neat surgical operation, it is therefore much better to empty the abscess through the neck. An incision is made along the anterior border of the sterno-mastoid, till the great vessels are reached, and then by blunt dissection internal to the carotid we reach the walls of the abscess, or, at least, the swollen tissues surrounding it. A finger then placed in the mouth, and another passed in the wound, will give an excellent idea of the exact position of the abscess, which is now opened with a pair of forceps whose jaws are then separated and withdrawn. Careful washing and drainage then follow.

It must be admitted, however, that this operation requires some degree of surgical skill, that it necessitates anæsthesia, and that in a few instances good operators have failed to find the pus in this way, and have been compelled after all to operate through the mouth. If the latter procedure is adopted, wrap the child up in a sheet, see that his hands are firmly held, and use the trocar or aspirator as already suggested. If the child is restless or frightened, it may be best to use the knife at once. Wrap the instrument in gauze or cotton to within a half an inch of the point. The mouth is kept widely opened with a cork placed between the teeth, or with a mouth-gag. Depress the tongue with the left forefinger, and feel the swelling, which is often quite low down. The knife must be introduced in the median line in order to avoid severe hemorrhage, and because the pressure on the tongue

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practically always produces a reflex action of the pharyngeal muscles which tends to push the swelling toward the mesial line. Cut downwards for about a half an inch, and immediately tilt the child sharply backwards, so that his head is well below the rest of the body, to avoid the entrance of pus within the trachea.

*Ludwig's Angina.*—This is a severe infection, associated with a high degree of sepsis in most cases, and affects the floor of the mouth, involving the cellular tissue between the mucous membrane and the mylo-hyoid muscle. Never wait for evidences of fluctuation, for two reasons. In the first place the tendency is rather towards a sloughing and gangrenous condition than towards the formation of an abscess, and in the second case the trouble is commonly of so severely septic a nature that any delay is apt to prove fatal. Never try to open through the mouth, for by this route it is impossible to thoroughly expose the focus of infection. Make a long incision paralld with the border of the lower jaw, cutting through the mylo-hyoid muscle, and opening widely the submaxillary space. The tissues are so indurated as to have a wooden feel, and are extremely tense. You may find no pus at all, or only a few drops of stinking, sanious, turbid fluid. In advanced cases a regular gangrenous condition has developed. Wash out with peroxide of hydrogen or with permanganate of potash solution, and touch all gangrenous spots with a strong solution of chloride of zinc, or with the actual cautery. The process is often so severe that the patients will die of sepsis notwithstanding such energetic treatment. The after care consists in packing loosely with iodoform gauze, and washing out daily and trimming away all sloughs with the scissors. General tonic measures are indicated.

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*Wounds and Injuries* of the neck may roughly be classed as slight or severe. The slighter ones are amenable to the simple rules of surgical treatment elsewhere, while those that are severe need to be treated according to certain special indications. Many of these injuries enter the domain of major surgery, but as they always are emergencies which any one may be called upon to treat suddenly, they must be considered here.

*Severe injuries of the neck* must be treated according to a few easily remembered principles. Whenever a vessel large enough to give rise to hemorrhage of any gravity is severed, both ends must invariably be sought for and ligated, because the collateral circulation is so great that the distal end may bleed nearly as sharply as the proximal one, and may, even if it is not bleeding when seen by the surgeon, give rise to serious secondary hemorrhage. Of at least equal import is the fact that any wound or injury in the neighborhood of the air passages may give rise to intense and even fatal dyspnoea, even when these passages are not themselves involved. When the latter partake directly of the traumatism, dyspnoea from œdema of the glottis and other causes becomes almost a probability, if the injury is at all severe. Keeping these facts in mind, it becomes evident that the principal objects of our interventions will be to

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provide against hemorrhage and to exercise watchful care lest dyspnœa supervenes, and to interfere immediately in the latter case. It is an invariable rule that in the presence of increasing dyspnœa the patient must not be left by the surgeon unless tracheotomy is first performed, and that this operation should be resorted to as soon as there is the slightest prospect that it will eventually be needed, for the reason that the operation becomes more difficult to perform with every minute of delay, owing to the intense swelling of the parts, and the great engorgement of the venous circulation. In many instances, particularly in adults, a true tracheotomy is practically impossible, and the opening must be made in the centre of the crico-thyroid membrane. This may be done with one stab of the scalpel. The author has done it with a pocket-knife. Keep the opening patent with a dressing forceps, or with a hairpin, as described further on. If there is time it is better to make a vertical incision in the median line, and to open transversely through the membrane between the cricoid and thyroid cartilages.

*Incised Wounds.*—Minor wounds are of little importance, and are treated as wounds elsewhere.

Severe incised wounds are most frequently seen in cases of attempted suicide. When, as usual, they are inflicted with the right hand, the beginning of the incision is usually much higher than the end. It generally commences quite near the mastoid process, and goes downwards towards the mesial line, in a direction which leads towards a point situated at about the middle of the sterno-mastoid on the opposite side, but seldom reaching as far as this. The reason why so many, comparatively speaking, fail to kill themselves immediately, is that the incision very frequently begins



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at the inner border of the left sterno-mastoid, and fails to reach immediately a depth sufficient to sever the larger vessels. The frightened individual often immediately applies strong pressure, which in some cases succeeds in at least partially checking the hemorrhage. In any case where the patient does not bleed to death in a few minutes, therefore, there is often good prospect of recovery, none but the smaller veins being cut through. These may bleed frightfully, however, for some minutes. *Treatment*: The severed vessels are first sought out and tied at both extremities, after the wound has been thoroughly flushed out with boiled water or any mild antiseptic solution. If the larynx is opened take care to allow no fluid to run down the trachea. The thyro-hyoid space may have been opened, and the epiglottis injured. Wounds of the larynx should be sutured, but space for a tube must be left, or else a laryngotomy or tracheotomy must be done, if the situation of the wound, as is often the case, is unfavorable for the placing of a tube. In some instances the wound has been inflicted with such determination that the œsophagus itself is severed. If this is the case, it must be sutured and an œsophageal tube left permanently. But a very small percentage, however, of such cases can recover. In many instances it will be necessary to forcibly restrain such patients from inflicting further injury upon themselves, and they must always be suspected of such an intention, even when they appear most docile and amenable to reason, as they often pretend repentance for their act in order to deceive the watchfulness of their attendants.

*Punctured Wounds.*—These may be of great severity, injuring any of the great vessels and nerves, or penetrating the respiratory passages. If there is any

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evidence of such occurrences, the wound must be immediately enlarged, vessels must be tied, and severed nerves sutured if they can be found.

*Wry-Neck.*—This is a condition which may be acute or chronic. If acute, it is commonly due to so-called arthritic or rheumatoid conditions, and is most frequently seen after exposure to cold. Antirheumatic



FIG. 19. Wry-neck, front view.

treatment, massage and electricity may be used. In a few cases it may be necessary to place the head in a proper position by the aid of plaster-of-Paris or other apparatus, as described in the treatment of chronic torticollis.

Chronic wry-neck in children and young adults

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must be distinguished from the lateral bent positions often assumed as a result of chronic otitis, or of strabismus, or of the presence of corneal opacities. The presence of cervical Pott's disease, which causes muscular contractures, must also be differentiated. The latter disease gives pain on pressing the cervical vertebræ, while the neck is immobilized, and the surgeon fails to find the hard cord formed by the sterno-mastoid in wry-neck. Parents often tell the surgeon that a child has only recently been noticed to have torticollis. If the sterno-mastoid is distinctly shortened and there is any hemiatrophy of the face, you may be sure that the disease has existed quite a long time.

In any but very slight degrees, nothing but operation will do any good, and parents must be reminded that the condition is a progressive one, attended by increasing deformity, by disturbance of the vision, and by spinal curvature.

There are two modes of operating, subcutaneously and by the open method.

*Subcutaneous Operation.*—This procedure often suffices when the cases are not of very great severity. The patient's head is always thrown slightly back, inclining to the affected side, with an amount of rotation sufficient to turn the face away from this side. These are the conditions to be remedied.

For operation, increase the rotation in order to stretch the sterno-mastoid, and proceed to the section of the sternal and clavicular ends of the muscle. The anterior jugular vein lies near the inner border of the sternal head, while the external jugular vein lies near the posterior border of the clavicular head. If the sternal tendon is incised at a distance of an inch and a quarter to two inches above its insertion, you will

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avoid the horizontal part of the anterior jugular. The clavicular head must be incised by inserting the tenotome at a point about a half an inch above the clavicle, at the external border of the muscle, thus passing between it and the external jugular. Always look first for any unusual position of the vessels. If properly performed, there is very little danger in this operation, although accidents have occurred.



FIG. 20. Wry-neck, back view.

*Open Operation*—This method must invariably be selected if there are any anatomical anomalies of the vessels, and in inveterate cases with extensive sclerotic degeneration. The deformity in itself is so bad that the making of scars is a very minor matter.



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Many surgeons advocate an incision above and parallel with the clavicle, through which both heads of the muscle are divided. After this has been accomplished, the head should be further bent towards the sound side, when a number of tense cords consisting of thickened fascia will be revealed to the examining fingers. These cords should be thoroughly divided in order to obtain the best results. The



FIG. 21. Apparatus consisting of plaster corset and head-band, to which rings are attached. Rubber tubing should hold the head in over-correction of deformity shown in Fig. 19.

same operation may also be done through an inch and a half or a two inch incision, parallel to the inner border of the clavicular head. This is incised, and then the incision is pulled, with a hook, over the sternal head, which is caught up with an aneurism

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needle and divided. The fascia is treated as outlined above.

*After-Treatment.*—Unless careful after-treatment is persisted in, the operation will often prove at least a partial failure. The patient should wear an apparatus so contrived as to over-correct the deformity. Sayre and others have devised effec-



FIG. 22. Same apparatus, side view. The drawing does not show the over-correction.

tive devices for this purpose, but the writer is of the opinion that the very best is one that may be made by every surgeon. A few days after the operation the patient is suspended in an extension apparatus, and a plaster jacket is fitted on, with small brass rings let in, as shown in Fig. 21. A plaster bandage is also applied around the head, in which

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several rings are also let in, on the sound side. Rubber tubing is then placed, pulling from behind the ear to a ring somewhat beyond the median line of the chest; the head is also pulled to the sound side by a tube running from above the ear to a shoulder strap. The deformity must always be amply over-corrected by the apparatus. The illustrations show plainly the general principle, and individual operators can modify the artificial muscles to suit the exigencies of every case.

*Spasmodic Wry-Neck.*—This is a condition sometimes benefited by an antirheumatic and antineuralgic treatment. In inveterate and very painful cases nothing but extensive operative measures are efficient, and even then a few cases are found in which operation fails to effect much good. Resection of the spinal accessory nerve may prove insufficient, because it paralyses but the sterno-mastoid and trapezius, while the other muscles of rotation are also involved, but are supplied by the three first spinal nerves, which may have to be resected, a difficult operation. Kocher has obtained good results from extensive and multiple myotomies.

*Cervical Adenitis.*—Enlargement of one or more glands of the neck is often of tubercular origin, but it is a fairly frequent error to call nearly all glandular enlargements of the neck, especially in children and young people, by the name of tubercular adenitis. This mistake is a bad one for the reason that the surgeon who makes it is apt to neglect the thorough examination which often reveals easily removable causes. Some of the worst cases we see in the poorer classes are due to the presence of lice, with the consequent eczema of the scalp which results from the irritation and scratching. Any inflammation about the throat, mouth, nose or ear, and, in

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fact, any septic process of the face or head, may be followed by glandular enlargement. If any of these causes are at fault, treatment directed to the original septic condition will cause a subsidence of the glandular swelling, unless pus has already formed. If, on the other hand, it is due to a strumous condition, we must combine general measures with local treatment. It must not be forgotten, however, that a tubercular infection of the glands may result from infection through an open door left by the presence of non-tubercular lesions, such as bad teeth, catarrhal troubles, and skin diseases. Syphilis may be at fault, in which case the glands are hard and seldom inclined to suppurate. In old people any glandular swelling about the neck should arouse suspicion of the presence of malignant disease of the mouth, nose, and throat.

*Treatment.*—As we have seen, treatment consists, in many cases, of the elimination of certain primary causes. In tubercular adenitis, if we see the patient when the glands are still small and movable, attention to the general health, with the use of iron, arsenic and cod-liver oil, may result in an entire disappearance of the swelling. If the glands are large and numerous, thorough extirpation is absolutely indicated, often necessitating operations too extensive to be considered here. If suppuration has already taken place, incision of the abscess and thorough curetting should be done, followed by packing with gauze impregnated with iodoform glycerin. Occasionally it may be advisable to aspirate and inject iodoform glycerin. The results of this procedure, however, are not always satisfactory. If sinuses remain after suppuration has occurred, they may sometimes be cured by the application of chloride



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of zinc or iodine, but thorough curetting or excision is more satisfactory.

Malignant tumors of the neck are frequent, and belong to the domain of major surgery. Sebaceous cysts, lipomata, and papillomata occur often enough, and their removal, unless quite extensive, is usually easy.

*Sinuses from Unclosed Branchial Clefts.*—These sinuses may be quite short, or they may reach a great depth; while they give rise to no pain, they are inconvenient, and patients often desire to become rid of them. It is frequently quite difficult to insert a probe along their whole course. If of little extent, the treatment consists in the application of iodine or chloride of zinc. If extensive, the writer, as in sinuses in other parts of the body, usually stains them by injecting a strong solution of blue pyoctanin along their course, and then dissects them out.

*Mumps.*—Infectious parotiditis is of surgical interest chiefly from the fact that orchitis or inflammation of the mammary gland may follow it. The presence of orchitis in boys may lead to undeserved suspicion on the part of parents or guardians, and the writer has been compelled to show a medical book to an angry father before he would believe that his son had not acquired a venereal disease. The sub-maxillary gland is sometimes the one that is affected. Suppuration occasionally, though comparatively seldom, occurs, in which case free incision is required.

## THE LARYNX AND TRACHEA.

*Fractures and Dislocations of the Laryngeal Cartilages.*—These are often attended with great dyspnœa, which, as is always the case in injuries of the neck, has a tendency to increase. If there is a distinct displacement of the cartilages, we must not at once proceed to reduce this by external manipulation, for we might so push a fragment as to obstruct the glottis. Sudden death has occurred in consequence of such ill-advised interference. It should be an invariable rule to tracheotomize before such reductions are attempted, or at least, to pass an intubation tube. In many instances the surgeon will be disappointed in his efforts to effect a perfect reduction, and, very frequently, the patients will not be able to breathe properly without the tracheotomy tube for a number of weeks. Laryngeal stricture may remain permanently. In one instance the writer extended the tracheotomy wound upwards, exposed the cricothyroid cartilages, and was able thus to reduce a fracture and maintain it by sutures. In these instances laryngotomy is seldom advisable, and intubation will probably sometimes prove insufficient. Tracheotomy is necessary, and is here often a difficult operation, owing to the obliteration of all land-marks, emphysema, and effusion of blood.

*Wounds of the Larynx.*—It is always well to remember that any wound of the larynx, even when

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not severe at first, may give rise to serious complications due to the formation of intra-laryngeal hæmatoma, or to the diffusion of the sub-mucous swelling with consequent œdema of the glottis.

*Burns.*—Burns of the respiratory passages are always serious, and the possibility of progressive dangerous conditions, upon which the writer has already so much insisted in all traumas of the upper air-passages, is ever present.

*Oedema of the Glottis* may arise in consequence of any injury of or about the air-passages, or in consequence of various diseases of this region, or following some of the infectious diseases. In some instances the inhalation of steam, with the application of cold to the throat, or of heat, may suffice to ward off a threatened attack. More frequently scarification is necessary. Wrap up a knife to within a quarter of an inch of the point, and inserting the left index finger down to the epiglottis, guide the knife alongside the finger and scarify the epiglottis two or three times. There will usually at first be somewhat profuse bleeding, which very soon stops, and the relief experienced is usually very great. If the patient is a child it must be firmly held, and in all cases the mouth must be kept opened by a gag or a large cork forced between the back teeth.

*Tracheotomy.*—This operation is one that every medical or surgical practitioner may be called upon to do at a moment's notice, and often when he is totally unprepared for it. Since Trousseau did it in the country, with nothing but a scalpel and a leaden bullet which he flattened with a hammer and rolled into a tube, it has often been done with a pocket-knife as the sole instrument at hand. Books on anatomy and surgery describe the operation with such

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minute detail that beginners are very apt to dread it much more than it deserves to be, and to go to work as if about to undertake a nice dissection. It is a common fault to attempt to work through too short an incision.

The neck is stretched by placing a roll beneath it, the shoulders being placed over a small pillow or rolled blanket, and the head allowed to hang quite low. The skin and subcutaneous fat, which in children often constitutes a thick layer, are divided in



FIG. 23. Hair-pin bent to serve as temporary tracheotomy tube. one incision, and a rapid glance shows whether there are any veins lying across the field. If so they are tied at the sides, or caught with forceps and cut through. If the isthmus of the thyroid is in the way, it may be tied in two places and severed. The fascia is then torn through with a director, or with the point of the knife, or with scissors, and the trachea is exposed. The first incision may give rise to alarming bleeding, or else hemorrhage may occur only some time after, because the veins were collapsed when cut through. In any case, it is often best to



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try and seize them *en masse* with artery forceps. If this seems ineffective, the writer is in the habit of pressing strongly on either side of the mesial line with the fore and middle fingers of the left hand, leaving sufficient space between the fingers to enable him to continue the incision and open the trachea. As soon as this is done the bleeding usually stops. The knife is inserted between two rings, point upwards, and two or three of them are divided. The dilator is then employed to make room for the tube, which is inserted at once, and tied with tapes around the neck.

When the operation is one of urgency, and no tracheal tube is at hand, some makeshift must be employed. The surgeon may simply pass a strong thread in each lip of the incision in the trachea itself, and tie the ends behind the neck. This will open up a chink large enough to give good results for a short time, but must be soon replaced by a tube, or else the necessary tension on the threads will cause them to cut through the cartilages. The author has employed a hair pin, bent as shown in the accompanying illustration, and has found it an efficient device. A piece of a large woven catheter may be transfixed with a safety pin, and softened in hot water; being bent in the requisite shape it is then introduced and tapes are fastened to each end of the pin. A hairpin bent into short rings at the ends will answer even better than the safety pin. There is hardly a limit to the devices which a slight amount of ingenuity will enable the surgeon to contrive, and there never



FIG. 24.

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is any excuse for allowing a patient to suffocate to death because a full set of tracheotomy instruments is not at hand. The writer has purposely said nothing of the anatomy of this operation, because when the urgency comes what is to be done is to cut down and get to the trachea. If the operator knows his anatomy well, so much the better for the patient and for him, but he will have no time to look it over in an emergency.

## THE UPPER EXTREMITY.

### THE UPPER EXTREMITY.

#### THE FOREARM AND ARM.

The only operative procedures pertaining to minor surgery in this region are those concerned in bleeding, and in the infusion within a vein of blood and of normal salt solutions.

*Venesection.*—This operation, which is of the greatest value in carefully selected cases, is altogether too much neglected by modern practitioners. Certain cases of traumatic congestion of the lungs or pneumonia, such as occasionally follow severe injuries of the chest walls, with or without fracture of one or more ribs, and attended with severe degrees of cyanosis, orthopnœa and sharp pain, may be wonderfully relieved by the abstraction of eight or ten ounces of blood, and this may be repeated if needed. In some cases of chronic bronchitis in which there is a sudden congestion, due, possibly to exposure, and in which severe dyspnœa, a very weak pulse, and a prolonged and wheezing expiration, with a chest full of moist, sonorous and mucous rales, may all be observed, the right heart is distended with blood which its walls are too weak to expel. In such patients a good bleeding absolutely saves life when nothing else would avail.

For this operation the arm is tightly constricted about its middle with a bandage, which must not, however, be so strongly applied as to stop the arterial circulation. The median basilic or median cephalic,

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whichever is most prominent, is selected, and the surgeon steadies it by placing his thumb upon it, just below the point of incision. The skin and vein must not be merely punctured. They should be incised, taking care that the skin incision is longer than that in the vein. The cut should be across the vessel, and not longitudinal. The limb should be kept still, so that the skin incision may not slip above or below that in the vein, when the bleeding would cease. If, owing to the presence of much fat, or to a much weakened circulation, or to the small size of the veins, these cannot be readily found, the internal saphena at the ankle may be opened instead.

*Intravenous Infusion.*—Transfusion of blood is so fast disappearing from our methods that it is scarcely worth while to refer to it. Intravenous infusion of saline solutions appears to be just as effective, and is free from many dangers inherent to the use of blood. A number of solutions have been devised, but that made of eight parts of salt to a thousand of water, which should be sterilized and heated to 102°, is the most simple, and appears to be just as effective as any of the others. The operation is conducted as follows: Bandage the middle of the arm, as in venesection, and make a longitudinal incision over the vein. This is best done by marking the location of the incision upon the skin, and then drawing the latter to one side and making the cut. The skin is then allowed to slip back into place, and the vein will be exposed. A small transverse incision in the vein will then permit the introduction of the canula. Unless the knife is very sharp, the anterior wall alone of the vein may be incised, and little or no blood will flow. A sharp pair of scissors will often advantageously replace the scalpel. The bandage



## THE HAND AND FINGERS.

upon the arm is removed as soon as the canula is introduced, and its application is only useful to those who are not possessed of much surgical dexterity. The operator should not worry too much over the temperature of the water, as recent investigations show that fairly considerable departures from the temperature mentioned above do not seem to produce bad results.

The employment of intra-venous infusion is likely to diminish rather than to increase in the near future, since there are excellent substitutes for it. A few years ago it was a measure of last resort, and therefore met with somewhat scanty success. Inasmuch as it is chiefly employed for the purpose of overcoming the effects of hemorrhage, surgeons now use it earlier than formerly, and obtain better results. It has been shown that the rectum can absorb large amount of saline solution, which immediately enters the circulation, and that the subcutaneous injection of this fluid is also most effective. This being the case, the venous method must, at least to some extent, be replaced by these other and more simple ones, although whenever exceedingly rapid effects are desired, the intra-venous injection will probably always be preferred.

## THE HAND AND FINGERS.

The great importance of the hands and fingers must compel us to pay them much attention. Subject, as they are, to a multitude of accidents and pathological conditions, we must constantly bear in mind the fact that all our endeavors must be bent towards obtaining good functional results. And here we are confronted

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with the fact that the best result is the one in which the process of healing has least interfered with the particular occupation of the patient. A result might be excellent in a field laborer or a hod-carrier which would prove disastrous to a violin-player. In every case, therefore, we must study the peculiar needs of the patient, and try to so adopt our methods as to enable him, to as great an extent as possible, to continue his work.

*Injuries of the Fingers and Hand.*—Incised wounds of the fingers are exceedingly common, and vary between trivial lesions of the skin and complete accidental amputation. The greatest danger inherent to them is septic infection, for the reason that the fingers are often soiled, and may have been engaged in occupations offering a peculiar liability to sepsis, as with butchers, cooks, etc. Moreover, the patients are apt to make use of dirty rags, filthy cobwebs, axle grease, well masticated quids, and all manner of nasty things, wherewith to stop bleeding. Thorough disinfection is, therefore, invariably indicated. Hemorrhage is seldom so great that pressure with a tight fitting bandage for some minutes will not stop it. Rarely the application of an artery forceps will be needed, and in this case the employment of a ligature is seldom required. A bandage applied tightly enough to stop hemorrhage should seldom be left in place more than a half an hour. It must then be removed, the wound cleaned anew, and a fresh dressing applied.

Wounds in which the pulp of the fingers has been sliced off, as happens by contact with the knives of planing and other machinery, are often best dressed in splints, a few days after the infliction of the injury, and skin-grafting is always advisable if it is at

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all extensive, owing to the fact that permanent flexion, forming a claw-finger, is apt to occur from cicatricial contraction.

When an incision involves a joint, we must take the utmost precaution against sepsis. Amputation is only advisable in case the soft tissues have so suffered that there is no prospect of proper nutrition. If sepsis has been avoided, the functional result will commonly be good. Stiffness of the joint is the rule at first, but later disappears to a considerable extent. The writer believes that the permanent stiffness which sometimes remains in these cases is often due in great part to a concomitant section of the tendon. If there is no union of the tendinous ends, the patient is unable to move the finger, and lack of motion in the joint is the chief factor in producing ankylosis. Division of the tendons is often followed by spontaneous reunion, but this occurrence cannot be depended on, and this should be explained to the patient. Suture of the tendon should be done in every instance in which consent may be obtained. This rule must be maintained even in cases where there has been no articular injury, especially when the flexor tendons are injured. As these lie far more deeply than the extensor ones, they are apt to coexist with more severe injuries, which in themselves may have a tendency to cause stiffness. If the patient refuses the operation, as often happens, the fingers must be dressed and retained in a flexed position if the flexor tendon is severed, and are to be extended if the extensor tendon is cut through.

Section of the nerves of the fingers seldom causes trouble. If the parts are accurately placed in apposition the sensory function will return first, soon followed by motor ability.

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When an incised wound involves the bone, there is seldom any trouble if the latter is only partially cut through. If bony section has been complete, it seldom happens that the finger has not been entirely cut off. Sometimes, however, and especially when the wound has been inflicted from the dorsal side, the finger will hang on by a more or less extensive shred from the palmar surface. When this happens, it is worth while to endeavor to save the finger by bringing the cut surfaces together and carefully suturing the skin. This method is at times successful even when the finger has been entirely severed. Many patients, however, cannot spare the time required, especially when it is explained to them that they are only being given a chance.

Incised wounds of the hand, of varying grades, are also very common. If bleeding is severe, pressure will often fail to stop it, and for this reason, and also because more thorough asepsis and better union will be secured, severed vessels must be tied, generally at both ends. When the deep palmar arch is cut it is often nearly impossible to secure the end, and we may be forced to ligate the radial and ulnar arteries. Cut tendons should invariably be sutured. Incisions of nerves are but rarely of any great importance in the hand, both because the minor nerve trunks have a great tendency to unite after some time, and on account of the profuse nervous anastomosis of the hand. For this reason cutaneous insensibility is very seldom entire in any part of the hand as a result of incisions of the nerves. When the radial, median or ulnar nerves are severed at the wrist, we may often expect that their function will in time be restored, and nervous anastomosis will, to a considerable extent, maintain, before this has hap-



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pened, a good degree of functional and sensory power. Yet it is preferable not to depend upon this, and to cut down upon and unite the cut ends. Incised wounds of the radial and ulnar nerves at the wrist are very commonly accompanied by incision of tendons, and not infrequently by section of the radial and ulnar arteries. Hence, deep and extensive wounds on the flexor side of the wrist often require anæsthesia, arterial ligation, and tendon and nerve sutures. If nerves have been incised in this location, and are not sutured, nature may fail to bring about a subsequent union if the wound has been so extensive that the nerve branches have been unable to unite through the scar tissue, or to profit from anastomosis. Paralysis of the intrinsic muscles of the hand gives a rather bad prognosis, as they rapidly atrophy, and their functions are seldom well restored.

*Contused and Crushed Wounds of the Fingers and Hand.*—Lacerated wounds are nothing but irregular incisions, and are treated according to the principles laid down in regard to the latter. Contusion occurs in all degrees, from a slight hurt to the application of force sufficient to cause a bursting asunder of the soft tissues, or to utterly crush and pulpify both soft and hard structures. Surgeons seldom see contusions occurring without some degree of external wounding, as in these cases the injury is usually so slight as to need no special treatment. At times, however, very severe contusions occur without much injury to the skin. The varieties of contused and crushed wounds seen in practice are nearly always complicated. There is often a total or partial avulsion of the nails, or crushing with or without tearing away of some phalanges, in which case the tendon

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attached to the phalanx may be torn off at a point in the hand or at the wrist, or there may be extensive articular injury, such as compound dislocation, or compound fractures, or extensive laceration or section of nerves and vessels.

The fingers have so great a power to recover from injuries which, at first, would seem absolutely to require amputation, that the latter must never be lightly undertaken. Thorough washing out of the wound and the application of large wet dressings, kept wet with rubber or other protective, will often accomplish wonders. This course is often advisable, even if we deem it likely that amputation may be required later on, for the reason that hopeless-looking tissues may in a few days manifest evidence of vitality, and that the amputation, if found at last to be necessary, may be done lower than would otherwise have been the case. The stump will often get along better than if the amputation had been done through tissues that had not yet had a chance to regain their vitality.

Section of important structures must be treated as in incisions.

In compound dislocations the displacement must be reduced and the hand placed in a large wet dressing, after thorough cleansing. In these dislocations the head of the bone may be so thrust through the skin and soft tissues that the latter offer an impediment to the return of the bone to a proper position. In these injuries, of which the writer has seen several examples, chiefly in base-ball players, from the heavy impact of the ball upon the palmar aspect of the fingers, it is usually necessary to incise the skin and soft tissues that have slipped under the head of the bone, before the latter may be properly replaced.

Compound fractures of the fingers often do very

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well with proper coaptation, antiseptic dressing, and splinting. If the bone is comminuted loose fragments should be removed, but it must be very badly disorganized to allow of amputation.

Contusion or crushing of the hand itself must be treated according to the general principles already laid down.

*Foreign Bodies in the Fingers and Hand.*—All manner of sharp fragments or spiculæ of metal, bone, glass, etc., as well as shot or bullets, may become lodged in the fingers or hand. Some of these may be tolerated for a very long time, while others give rise to inflammatory complications for which patients seek early relief. Foreign bodies, here as elsewhere, may cause no trouble for periods extending into years, and suddenly give rise to pain of a neuralgic character. When the fingers and hand are affected, the pains commonly radiate to the forearm and shoulder.

If the foreign body is a fairly large one, that has been in its position for a short time only, it may usually be discovered with a probe, and removed with or without enlarging the wound of entrance. Splinters of various kinds seldom travel far from the point of entrance, and may usually be removed easily. Fish hooks should never be torn out, but must be pushed out by making the point come out at a different place. Splinters lodged under the finger nails may be pulled out; if this is impossible the nail is to be painted over the splinter with caustic soda or potash, and gradually scraped away with a knife or a piece of broken glass until the foreign body is reached. Needles, or their fragments, are often very hard to find, even a very short time after their entrance, and their removal must never be lightly undertaken. The patient may be absolutely certain

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in regard to their location, yet his feelings may be quite deceptive. Finally, some patients are certain of the presence of a foreign body which, as a matter of fact, does not exist. The writer was called to remove a needle from a lady's hand, some years ago, within a very short time after she had hurt herself with it while sewing. The incriminated needle was found sticking in her dress. If possible, an X-ray picture should always be secured before searching for a needle, and even with its help much care and patience is sometimes required in order to find it.

*Lesions of the Bones and Articulations of the Fingers and Hand.*—Sprains of the articulations, while common enough, are seen comparatively seldom by the surgeon, owing to the fact that, as a rule, they are of but slight severity. Like sprains of any other joints, they may be followed by arthritic manifestations for which appropriate treatment is necessary.

In sprains of the fingers, the flexor tendons are very seldom injured. Tearing away of the extensor tendons, however, is sometimes met with. It is due to sudden and forcible over-flexion of the last phalanx. In these cases the finger may easily be extended by the surgeon, but as soon as he loosens his hold the finger is flexed with a quick snap. The finger must be kept in an extended position and at rest for a long time. If the laceration occurs at the last phalanx over-extension is necessary. Repair often takes a number of weeks, and in some cases it is advisable to cut down and suture the tendon. The latter is so easily reached on the dorsal side of the fingers, that if the surgeon is sure of his asepsis the results must be good.

*Fractures of the Phalanges.*—Compound fractures were considered in speaking of crushing wounds, and



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are by far the most common, since, owing to their small size and mobility, it is rare that the phalanges, and especially the terminal ones, are subjected to a force such as to produce a simple fracture. The majority of simple fractures seen by the writer were produced in pugilistic encounters, during which a sharp blow upon a bony prominence, such as the point of the jaw or the olecranon, caused the breaking of one or more of the first phalanges. The fracture is nearly always, in such cases, a transverse one, usually with little displacement. A small splint should be applied to the extended finger, or better still, it may be immobilized in a small silicate or starch dressing.

*Fracture of the Metacarpal Bones.*—Simple fracture occurs here more frequently than is the case with the phalanges. The fractures are usually transverse, and there is usually very little displacement. When the latter occurs it is commonly easy to reduce. The hand, with the finger or fingers corresponding with the metacarpal injury, is best placed in a silicate dressing. Compound fractures are treated according to the principles spoken of in crushing wounds.

*Phalangeal and Metacarpophalangeal Dislocations.*—These injuries, which at first would seem to be comparatively trivial, are, as a matter of fact, often very troublesome. In many cases reduction can only be accomplished under anæsthesia, and sometimes incision of the soft parts, and even resection of the head of the bone, may be required. In compound dislocations, as we have already seen in connection with crushed and contused wounds, the skin over the head of the bone has often been forcibly split, and retracts under the head after the latter has passed through the button-hole thus made. In

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these cases incision of the skin will allow of reduction in most cases. If the skin and soft tissues are so injured that it is unsafe to apply great force, resection may have to be done. In old unreduced dislocations, such as are frequently enough seen in dispensary cases, and in the working classes generally, reduction by manipulation is at times quite impossible, especially after one or more months have elapsed. In these cases the deformity does not always prove of very great importance. If the terminal phalanx is affected, a hammer-finger results, which does not interfere much with the performance of ordinary so-called unskilled labor. If the proximal joints are at fault, a certain degree of pseudarthrosis finally results, so that the function becomes at least partially restored. Many forms of skilled labor, however, would be seriously interfered with, but it is seldom that patients doing skilled work are so careless as to neglect such injuries.

Simple metacarpo-phalangeal dislocation occurs far more seldom than the compound variety. As with inter-phalangeal luxations the treatment consists in over-extension of the distal phalanx, with manipulation followed by flexion. The metacarpo-phalangeal articulation of the thumb is far more frequently luxated than that of the fingers, and reduction is more difficult. This is attributed by Polaillon and others to the fact that the glenoid ligament, containing the sesamoid bones, follows the phalanx in all its displacements, forming, on the anterior border of the glenoid surface of the phalanx, a sort of process which moves like a hinge. If this ligament is caught between the head of the metacarpal bone and the phalanx reduction is impossible unless the ligament is made to pass in front of the metacarpal head.

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The treatment consists in strong traction in the axis of the finger, until the latter is of normal length. This is followed, while traction is continued, by strong over-extension. This displaces the ligament with its sesamoid bone. Pressure on the phalanx, followed by flexion, completes the reduction. If, notwithstanding this manœuvre, reduction proves impossible after several attempts, the surgeon will have recourse to a lateral incision, through which the bones may be replaced in position. Resection of a metacarpal head is a last resort to which a skilled surgeon will seldom be compelled to have recourse.

*Carpo-Metacarpal Dislocations.*—These luxations are infrequent, and require, for their production, an amount of direct force which commonly causes them to be of the compound variety. Simple dislocations are reduced by extension and pressure. Compound dislocations may necessitate resection of one or more bones, but these injuries are usually so severe that amputation may be indicated.

Fractures and dislocations of the upper limb can hardly be considered in a work devoted to minor surgery.

*Burns of the Fingers and Hands.*—As elsewhere, these injuries are of all degrees of severity. They are of extreme importance in the hand owing to their tendency to produce serious functional disturbances. The latter may be due to cicatricial deformities from retraction of the scar, to involvement of joints with consequent arthritic or septic inflammation, to destruction of tendons and muscles, etc. The general principle of treatment consists in obtaining perfectly aseptic surfaces, and, as soon as granulation begins to occur, making use of skin-grafting if the wound is extensive enough. If adjoining fingers are burned,

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they must be kept separate from one another in the dressings. Primary amputations for bad burns should practically never be resorted to. For dressings a ten per cent. iodoform or aristol ointment of vaselin or lanolin will prove very useful. There is no more satisfactory application for burns in general than a picric acid solution, consisting of picric acid, 75 grains, alcohol, two ounces, and distilled water, one quart. This relieves pain and maintains the surfaces aseptic. Its use must be discontinued as soon as granulations begin to form. In burns of the palmar surfaces of the hand and fingers, which often happen from grasping a hot bar of metal, extension by splints must be maintained, to guard against retraction, and skin grafting will usually have to be resorted to.

*Frost-Bites.*—These are of common occurrence in northern countries, and are usually of moderate degrees of severity. They are to be treated practically in the same way as burns. The frost-bitten parts should be well washed in cold water, and the patient must be prevented from holding them near a fire. The dressings are the same as for burns. Amputations should not be done until the less affected tissues have thoroughly regained their vitality. The milder degrees of frost-bite are often followed by the appearance of erythematous or eczematous lesions of the skin, which will respond to appropriate treatment. In many instances these cutaneous lesions are due to iodoform or any of the iodine antiseptic powders. If this is the case their use should at once be discontinued. The writer never uses these preparations in any case in which he is unable to keep daily watch over the effects of the dressings.

*Deformities of the Fingers and Hand.*—Cicatricial



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contractures are frequent, and are commonly due to burns or to the effects of phlegmonous processes. These contractures nearly always affect the palmar surfaces, because the injuries and pathological processes causing them usually involve the latter, and because flexion of the fingers at an early date tends to overcome any disposition to stiffening in an extended position.

*Treatment.*—Preventive treatment is decidedly successful in a certain number of cases of burns of the palmar surfaces, in which skin-grafting and maintenance in exaggerated extension will prevent contracture. In the presence of phlegmonous processes, however, we can do much less, as a considerable contraction will often take place before the surfaces are sound enough to be grafted, and the tissues are so widely and deeply involved. Cases of contracture are often seen for the first time after the trouble is already established, too late for any prophylactic measures. In traumatic cases the cicatricial bands may be excised, the fingers straightened out, and skin grafting done. If the bands are small several incisions across them may suffice to straighten out the finger. Either of these processes must permit of easy extension of the digit, and the incision must include all tissues down to the bone, if necessary, to accomplish this end. A perfect result can never be promised, but we may confidently expect a fair measure of improvement. If the trouble is due to phlegmonous processes, there is seldom any possibility of relief by plastic measures, and if the finger is in the way it must be amputated. In case the contracture is so severe as to involve the whole hand and fingers, forming one large claw, nothing can be done, and amputation is not advisable, as even a claw-hand is better than an artificial one.

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*Dupuytren's Contracture.*—This affection, which may involve one or more fingers, although the thumb is very rarely affected, is due to a contraction of the palmar fascia and of its digital prolongations. The appearance of the contracted fascia is remarkably similar to that of cicatricial tissue. (Fig. 25.) In the majority of cases the little and ring fingers are contracted. In cases that have lasted very long the peculiar condensation of the tissues may affect the tendons and the true skin, thus making the surgical



FIG. 25. Appearance of the palmar surface in early Dupuytren's contracture. FIG. 26. Dupuytren's contracture.

treatment somewhat more difficult. The disease appears to be frequently associated with an arthritic tendency. In some instances there is evidence of traumatic and nervous disturbances, but in these cases the uric acid diathesis will nearly always be found.

*Treatment.*—Operation is the only measure to be considered as a curative factor, although the employment of anti-rheumatic measures is advisable in addition to the surgical procedures. Either the subcutaneous or open method may be adopted.

*Subcutaneous Operation.*—For this operation the writer makes use of a small tenotomy knife shaped

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like a cataract knife, but slightly larger and stronger. The blade is introduced flat under the skin, then the cutting edge is turned downward, and the dense fascia is severed. The secret of success lies in multiple incisions that cut through the fascia in a number of places. The fingers themselves usually require no attention, as thorough division of the palmar bands is sufficient.

*Open Operation.*—This procedure is preferred by some writers, but possesses some disadvantages. In the first place the multiple sections I advocate would necessitate a number of cutaneous incisions, resulting in the formation of much cicatricial tissue in the skin, and the process of healing commonly is of longer duration than with the subcutaneous method. The only class of cases in which it is to be preferred is in that already referred to, in which the disease has lasted a long time, and the true skin and tendons are affected. Here we are compelled to incise the skin widely, and sometimes to dissect out and sever the tendons.

These operative measures are best conducted under cocaine or eucaïne anæsthesia, after application of an Esmarch bandage.

*Syndactylism.*—Webbed fingers are congenital malformations, although a condition somewhat similar may result from adherence of raw surfaces in cases of burns or frost-bite, in which the fingers have not been kept separate during the healing process.

The fingers are commonly united by skin and connective tissue. In a few rare cases the bony structures have adhered.

*Treatment.*—This consists in separation of the fingers with the formation of suitable flaps. Simple division of the web is hardly ever permissible, for the

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reason that the fingers usually adhere very closely, and that section of the interdigital tissues would leave large surfaces to be covered by skin over granulations. By far the best operation is that devised by

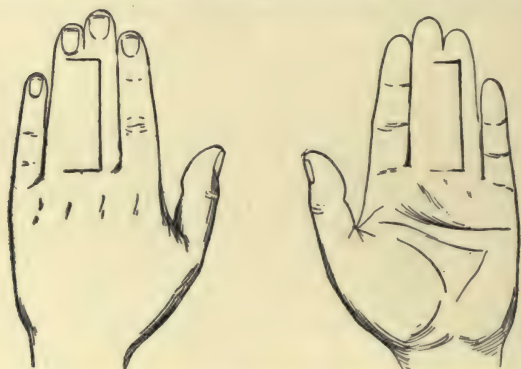


FIG. 27. Didot's operation for webbed fingers. Lines of incision.



FIG. 28. Didot's operation for webbed fingers completed.

Didot, who makes a longitudinal incision, as long as the web, on the dorsal surface of one finger and the palmar surface of the other. The skin is then raised



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so that the flap taken from each finger serves to cover the denuded space of the other.

*Supernumerary Fingers.*—Polydactylism may occur in one or both hands, and the tendency to this malformation has been observed, in certain cases, to be an hereditary trait. The only means of correction lies in the amputation of the supernumerary digits, which should be practiced at an early age.

*Ankylosis of the Fingers.*—Whenever all the fingers are ankylosed in a flexed condition, as a result of deep phlegmonous processes, or as a consequence of extensive traumatic lesions affecting the palm, the surgeon can do very little, and, as has already been stated, a claw hand is often better than an artificial



FIG. 29. Polydactylism.

one, so that amputation is seldom advisable. In the case of ankylosis of a single finger, however, a good deal may be done. A finger that is permanently flexed or extended is much in the way, and amputation is often the best course to take. (Fig 30.) We sometimes see hammer-fingers, resembling the condition known as hammer-toe. Section of the flexor tendon may suffice (Fig. 31), but it may be found necessary especially if the condition has lasted a long time, to resect one or both heads forming the phalanx. If it

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is enough to resect one head, the proximal one is to be selected.

Malpositions of the fingers occasionally arise in hysterical subjects. If this condition is suspected, general anæsthesia may be brought about, when it will be found that the contractures disappear, to recur again as the patient returns to consciousness. General measures against the hysterical tendency, with local massage, liniments, etc., will often bring about a cure.



FIG. 30. Permanent flexion.



FIG. 31. Hammer fingers.

*Septic Conditions of the Hand and Fingers.*—Sepsis affecting the hands and fingers may roughly be divided into accidental and constitutional or systemic. In the first class are all the cases in which the infection is the immediate result of the entrance of pathogenic organisms through some solution of continuity of the skin, while the second comprises all the cases which result from some form of systemic infection.

*Accidental Sepsis.*—This form of sepsis constitutes a large majority of all the cases of sepsis that the surgeon is called upon to see. The frequency of wounds upon the hands and fingers, their usually soiled condition at the time of injury, and the un-

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cleanliness of the objects which inflict the injury, are the causes for this state of things. Sepsis varies much in intensity, according to which one of the pyogenic or other infectious germs is at fault, and may consist in nothing more than a temporary blush surrounding a wound, or may go on to such destructive and toxic action as to jeopardize life itself.

The behavior of septic wounds of the hands and fingers is that of sepsis affecting any part of the body, and must be considered from the standpoint of effects produced upon the anatomical parts. The symptoms are pain, redness, swelling, and the formation of more or less pus. The pain is nearly always of a very distinctively throbbing character, and is intensified by the fact that the lesion occurs among dense fasciæ and close to bony structures. The amount of pus formed is no indication of the severity of the process, since frequently the most severe cases are those in which the infection is of a gangrenous form, in which very little pus is produced.

*Prophylaxis.*—Every wound of this region, however trivial, should be thoroughly cleansed with some antiseptic solution, while all surrounding parts should be scrubbed with ether or alcohol after a thorough use of soap and water. Dissecting wounds and others partaking of the same character, such as constantly occur among butchers and cooks, should be treated with pure peroxide of hydrogen solution, or washed, if not too large, with strong permanganate of potash solution, or with dilute acetic acid, or with a watery solution of iodine, or strong carbolic lotion, and then properly protected by a dressing.

*Treatment.*—Infection commonly arises from wounds that are at first so trivial that the patients pay no attention to them, and we first see these lesions

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after the septic process is well advanced. I desire at once to insist upon the danger of any temporizing measures. Treatment must be immediate, and consists in liberal incision of the affected tissues. Waiting for the formation of pus, which, as we have seen, may not form at all, is practically an invitation to the disease to do its worst before we really interfere. The writer, during his anatomical studies, and in the performance of several hundred autopsies, besides several years of teaching operative surgery on the cadaver, has suffered from many infected dissecting wounds. Of these several were incurred many years ago, when a medical student, and were at first treated by poulticing, as was then the custom. Each one of these caused long interruptions from work, much suffering, and considerable systemic disturbance. Later on any wound which began to be painful and red was immediately incised, any small centre of sphacelation was removed with scissors, and the lips of the incision were thoroughly rubbed with a pointed match dipped in pure carbolic acid, after which a wet dressing was applied. Since adopting this method the writer has never suffered from more than very temporary disability on account of an infected dissecting wound.

If the infection has already reached a considerable degree of severity when the patient is first seen, thorough incision must be practiced, local foci of infection should be treated with strong antiseptics, such as solution of chloride of zinc (gr. xl- $\bar{5}$  j), sphacelated tissue should be removed with knife or scissors, and a large wet dressing must be applied. Daily dressing is imperative. Here the writer desires to warn against the use of carbolic acid for wet dressings, as gangrene of the fingers is not a very uncommon result of its use, as shown by the fact that,



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in the last sixteen years, he has had to remove six fingers and one toe for carbolic acid gangrene. In bad septic cases there is no mode of treatment that gives such excellent results as placing the whole hand and forearm in a vessel containing an antiseptic solution, such as one to two or three thousand bichloride, and allowing it to remain in it during all of the waking hours, a large wet dressing being substituted at night.

*Panaritium*.—Paronychia, whitlow, run-around. These terms are applied to a septic infection commonly affecting the tissues about the nails, but frequently enough observed in the pulp of the fingers. When it occurs in the form of the familiar run-around, the epidermal layers around the nail are undermined by pus, which often penetrates the subungual tissues, thus lifting the nail from its bed. In these cases the skin must be incised over the whole affected area, usually a painless process, as it has lost its vitality as soon as it became detached from the deeper layers. If there is pus beneath the nail, the latter must be cut away as liberally as possible, *i. e.*, wherever a yellow tint of the finger nail shows the presence of pus beneath it. It is sometimes necessary to bore an opening through the nail in order to reach the pus.

*Panaritium*, affecting the pulp of the fingers, is not usually due to the same form of infection as the so-called run-around. Pus is seldom formed in any large amount, and the tendency is toward gangrenous changes with the formation of only a little pus. The typical whitlow commonly begins in an area of redness and hardening of the tissues, with throbbing pain, in the centre of which a small white spot soon forms, denoting the presence of a minute drop of pus.

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Panaritium is often considered as a systemic disease, for the reason that certain trophic changes, as in Morvan's disease, and certain organic maladies, such as diabetes, greatly favor its occurrence. Yet it is very probable that even in these conditions there is always a direct inoculation through a small puncture or abrasion, and that the altered systemic condition prevents phagocytosis and favors the development of sepsis. In the run-around, as we have seen, the infection is sub-epidermic. In whitlow it is subcutaneous, and hence attended with greater pain and more extensive destruction. In more severe cases the seat of the disease lies in the fibro-synovial sheath of the flexor tendons, or, worse still, in the periosteal layers, causing a true gangrenous periostitis, which most frequently affects the terminal phalanges, and is apt to cause a necrosis of the bone. In rare instances we see panaritia which go on to exceedingly rapid gangrene of the whole or part of one or more fingers. It is evident that any one of the milder varieties may be rapidly converted into one of the severer forms by extension of the septic process to neighboring structures. In Morvan's disease the panaritia may be of every degree of severity, and the condition is associated with the characteristic diminution of sensibility of the skin over one or more limbs, with areas of anæsthesia that are scattered irregularly over various cutaneous surfaces.

The sub-epidermic forms are the only ones whose severity, with proper treatment, is usually trifling. Loss of the nail is apt to be the worst result observed. All the other forms give rise to a serious prognosis in many instances, from the standpoint of the functions. Marked scars and deformity of the pulp occur with great frequency; loss of the terminal phalanx

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is often accompanied by ankylosis of the other phalanges, resulting in a stiff finger which had often best be amputated. Besides these malformations, there is always a danger that there may occur a purulent extension involving the hand and forearm, and sometimes affecting the whole axillary region. With the present method of rapid surgical intervention these severer cases are becoming rare, and there are far fewer deaths among the medical profession than formerly as a result of dissecting wounds.

*Treatment.*—At the risk of being tedious, the writer feels compelled once more to insist upon the fact that early incision, done, if possible, long before there is any evidence of the presence of pus, is the only scientific and proper treatment. If the patient refuses to submit to this, the whole hand must be placed in a copious wet dressing, or, better still, it should be kept in a vessel full of an antiseptic solution. As the pain is very severe in most cases, the use of lead and opium wash is indicated, and the writer commonly adds to it enough bichloride of mercury to make it in one to two thousand strength.

When a panaritium is to be incised, and the terminal phalanx is involved, the cut must be boldly carried down to the bone. If, however, one of the other two phalanges is affected, the incision must only be carried down to the sheath. If the latter is diseased, it must be incised, taking care not to cut across the tendon. In advanced cases, where there are purulent extensions into the palm of the hand and the forearm, every one of the infected tracts must be laid open. There is no class of cases in which bold surgery so well repays the operator as in extensive phlegmonous processes of the hand and fingers. The surgeon can never expect to obtain

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rapid union in these cases, but in a large number of instances he will succeed in checking and limiting the infection, and in at least partially preserving the functions.

*Phlegmons of the Palm.*—These are practically identical with panarititia, involving the pulp of the fingers. The causes are the same in most instances, but there are a certain number of cases observed in men engaged in hard manual labor, in whom the epidermal thickening is followed by inflammation of the sub-epidermal layers. When the trouble is sub-epidermal the patient retains a considerable power of moving the fingers, but when deeper tissues are affected, the fingers are practically immobilized and maintained in a semi-flexed position, while the pain is much greater, and the fever may run very high. Lymphangitis of the forearm and arm is far more frequent than when the fingers are the seat of the disease.

*Treatment.*—This consists in immediate single or multiple incisions, with or without drainage, followed by prolonged baths or wet dressings. In deep phlegmons the functional prognosis is often bad. Tendons are destroyed or immobilized within their sheaths, the muscles are badly atrophied, and the cellular tissues generally are converted into cicatricial masses. The fingers may be immovable and the whole hand converted into a large claw, which, however, is always better than an artificial limb.

*Tuberculosis.*—Tubercular affections of the hands and fingers, while not very common, occur in the practice of every busy surgeon, and are practically always observed in children and adolescents. They consist in so-called tubercular gummata, tubercular or cold abscesses, and tubercular ulcerations. Tuber-



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cular osteitis and synovitis also affect this region. All these affections are usually rather painless and of fairly slow evolution, and, except for the swelling, generally present none of the ordinary signs of active inflammation. Tubercular ulcerations are always the result of the breaking down of tubercular gummata or abscesses.

*Treatment.*—This always consists, for tubercular gummata and cold abscesses, in cutting down, cleaning out the infected foci with a curette, thoroughly swabbing the whole surface with the solution of chloride of zinc (gr. xl— $\frac{3}{4}$  j), and dressing with iodoform emulsion. If the gumma or abscess is small, union by first intention may be looked for in some of the cases. In tubercular osteitis the affected bone should be curetted or chiselled away. Tubercular synovitis requires incision and curetting or removal of the affected sheaths, and of all the rice-like particles generally found among the tubercular debris. Simple strumous dactylitis is usually amenable to constitutional treatment.

*Syphilis.*—Syphilitic affections of the hands and fingers commonly affect the skin, and are similar to the cutaneous manifestations of syphilis elsewhere. Syphilitic onychia is somewhat rare, and may lead to considerable malformation of the nails. Chancre of the fingers probably occurs more frequently in physicians than in any other class of society, for obvious reasons. It is sometimes rather painful at first, owing to the thickening of tissues situated so near bone, and the diagnosis is by no means always easy. The suspicious points consist in slowness to heal under ordinary antiseptic dressings, comparative indolence, hardened margin, which, however, is not as distinct as when it occurs upon mucous surfaces, and, finally,

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the appearance of roseola and other symptoms of syphilis. The treatment consists in thorough cleansing, dressing with iodoform or aristol, or some similar iodine derivative, and in systemic measures.

*Synovitis of the Hands or Fingers.*—We have already considered tubercular synovitis. The other forms observed are caused by inflammatory changes, either due to some form of traumatism, or to gonorrhœal infection.

Traumatic synovitis may follow any injury or wound, or may result from excessive friction of the tendons within their sheaths during the performance of excessive and unusual muscular exertion. When of a chronic nature, it gives rise to permanent flexion of the fingers in a good many instances. The treatment usually consists in rest, slight counter-irritation and compression by a bandage over a copious cotton dressing. Suppuration occasionally follows, necessitating incision and the use of wet dressings. Chronic synovitis is quite rebellious to treatment, and often leads to some permanent deformity. Prolonged anti-rheumatic treatment is often rather beneficial. Gonorrhœal synovitis is an affection much akin to gonorrhœal rheumatism, and the treatment is the same.

*Gangrene of the Fingers.*—This condition, as has already been stated, is sometimes seen after the prolonged use of carbolic acid dressings. It may also occur through the agency of excessive inflammatory changes, as in deep phlegmons and panaritium. It also takes place as a result of constitutional changes, such as atheromatous changes in the arteries and in diabetes and Morvan's disease. Cases due to traumatic influences, are, however, the most common. They arise as a consequence of constriction by rings

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and bands, and sometimes, though rarely, owing to interference with the circulation due to injury of bloodvessels. Amputation is nearly always necessary, and may often be delayed until a distinct line of separation is established, providing the gangrenous condition is associated with an afebrile state.

*Osteitis and Osteo-myelitis.*—Both these conditions are most frequently seen in children and young adults. Osteitis is frequently tubercular, as we have already seen. The condition known as *spina ventosa* to the older writers consisted in the fusiform swelling of the fingers seen not only in osteitis, but also in arthritis and in some forms of tumors.

*Treatment.*—Tubercular osteitis necessitates opening and curetting or chiselling away of bone. Inflammatory osteitis may disappear under the influence of counter-irritation and antiseptic dressings, but termination by suppuration is most frequent, and early operation is usually indicated. Osteo-myelitis is a severe and very painful affection, followed by great destruction, unless the bone is early removed or excavated down to the medullary cavity. The danger of a general septic extension is so great that delay is most harmful.

*Arthritis.*—This is frequently tubercular, and, when this is the case, it may be necessary to open the joint and remove the ends of the phalanges or of the metacarpal bones. Simple arthritis often appears to be gouty or rheumatic in origin, and may yield to the appropriate treatment for those conditions, with immobilization of the affected joints. Most stiff joints following acute or chronic arthritis are due to insufficient care in immobilizing them. Acute arthritis, affecting any of the phalangeal or metacarpal

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joints, may be of so great a degree of severity as to cause very extensive destruction, resulting in very stiff and misshapen fingers, which had often best be amputated.

*Tumors of the Hand and Fingers.*—As elsewhere, these occur both as benign and malignant growths.

*Benign Tumors.*—Both *paratendinous* and *articular synovial cysts* are commonly known as weeping sinews. In the former they arise in the vacuoles of the sheaths of the tendons, and in the latter within the diverticula of the articular synovial membranes. They vary in size between a small pea and a walnut, although the larger forms are seldom seen. They are painless, unless they become inflamed or compress some nerve-filament, and contain a liquid substance which may be quite fluid or may have a gelatinous consistency. The usual treatment is by crushing the cyst with a sharp blow from a book or other heavy body. In some instances it may become necessary to excise them with the usual antiseptic precautions. *Dermoid cysts and lipomata* are exceedingly rare, and require removal.

*Angiomata.*—Erectile tumors are occasionally found, and may be either venous or arterial. In some instances they have a tendency to remain circumscribed in size, whereas others may grow with some rapidity and necessitate extensive operative measures.

*Treatment.*—The smaller erectile tumors may be treated by repeated puncture with the electro-cautery needle, or with the needle of a galvanic battery. Larger tumors necessitate anæsthesia, hemostasis with the Esmarch bandage, and enucleation of the tumor with careful ligation of both afferent and



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efferent vessels. Cirroid tumors in the hand, as elsewhere, occasionally take on a character of malignancy in respect to growth, so that enucleation and ligation are followed by recurrence. In such cases amputation at a good distance above the seat of the disease would be indicated.

*Papillomata.*—These probably form the largest proportion of the neoplasms found upon the hands and fingers. Children are peculiarly liable to suffer from warts, which, in them, sometimes occur in very large numbers. The writer has seen seventy-one of these excrescences upon the two hands of one boy. In children they possess little or no importance excepting in the matter of appearance. In the aged, on the other hand, they must be considered, as papillomatous growths elsewhere, to constitute a danger, owing to the possibility of their assuming a character of malignancy.

*Treatment.*—Any of the more active cauterizing agents may be employed, but their use should never be entrusted to the patient, who, as a rule, will be apt to treat himself too heroically, producing at times severe eschars. A saturated solution of salicylic acid in alcohol may, however, safely be prescribed. Its daily use will usually suffice to remove the wart. Strong salicylic acid collodion is perhaps even more effective. Thorough curetting with a small, sharp scoop, to the extent that the wart is actually scooped out of its bed, is the most effective and rapid procedure. Simply shaving off the wart is absolutely useless, and will always be followed by recurrence. In the old, warts should either be let severely alone, or else they must be radically extirpated. After curetting a wart off, it is advisable to touch the spot with a small drop of carbolic acid.

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*Malignant Tumors.*—The only malignant growths commonly observed upon the hands and fingers are epitheliomata and sarcomata. The latter usually occur in the form of fibro-sarcomata. Epithelioma seems most frequently to affect the back of the hand, and is invariably, in this region, a growth affecting primarily the skin. Thorough removal is the only treatment worth considering, and this had far better be accomplished by a radical use of the knife. If this be objected to by the patient, treatment by caustics is indicated, but, unless carried out thoroughly, it will rather promote the growth of the neoplasm than cure it. Extensive growths, in order to carry out this idea, should be thoroughly curetted and then treated with the deliquesced chloride of zinc. When the trouble is of more recent origin, the employment of caustic pastes, such as Hebra's (arsenious acid, one part; red sulphuret of mercury, three parts; cold cream, twenty-four parts), or Marsden's (equal parts of arsenious acid and acacia, with water enough to form a paste) will be effective. Caustic potash is also useful. When employing the latter it is well to have some vinegar at hand with which to check the caustic action after it has been carried far enough.

The fibro-sarcomata affect the deeper tissues, and amputation is the only remedy.

*Incisions.*—From the anatomical standpoint, the only safe regions for incisions of the palm are those situated over the metacarpal bones, and these incisions should be carried no further up than to the junction of the middle and distal third of these bones, corresponding roughly to the first transverse line running across the palm, in order to avoid wounding the superficial palmar arch. Practically, however, it is permissible to incise wherever fluctuation is very

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marked, providing the knife be only thrust through the skin. It should, therefore, be accepted, as a rule, that incisions through the tense and brawny tissues found in those forms of septic infections not attended by the formation of much pus, should be done only on the anatomical lines already indicated, whereas marked abscess may, with due caution, be opened wherever it points most distinctly. In the case of extensive septic trouble of the hand, thorough work, consisting of as many incisions as may be necessary, with removal of sphacelated tissues, can only be done properly under general anæsthesia. Incisions of the

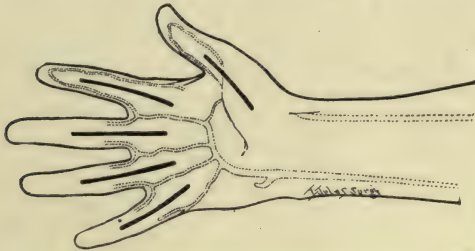


FIG. 32. Lines of incision in the hand.

fingers are to be carried down to the bone in the case of the distal phalanges, but the tendons must be avoided in the case of the other phalanges. If a deeper incision is required it should be made a little to one side of the mesial line, but not far enough, as a rule, to cut the digital artery.

*Amputations.*—In amputations of the fingers, the position of the joints is best remembered by noticing the fact that it is always the head of the upper or proximal bone which forms the prominence. The heads of the metacarpal bones form the knuckles, and so downward. As a rule, the distal phalanges are removed through the joint, while the middle are

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most frequently amputated through the continuity of the bone, and the proximal phalanges are amputated through the metacarpo-phalangeal joints. These should on no account, however, be considered as constituting hard and fast rules. The stiffness so greatly feared in amputations at the joint between the first and second phalanges, or through the continuity of the first phalanx, should deter the surgeon in some cases, yet he should remember that even a stump devoid of the power of flexion is often useful. In the case of the index finger, for instance, the rigid short stump is of the greatest value in opposing the thumb. With the little finger, leaving the proximal phalanx is of doubtful value from the standpoint of mechanical utility, but it is seldom in the



FIG. 33. Amputation through an interphalangeal joint.

way, and its preservation, at least in the non-laboring classes, is advisable from the standpoint of symmetry. Again, if all the fingers require removal, leaving one or more proximal phalanges will serve a most useful purpose in opposing the thumb. Moreover, if the surgeon makes it a rule always to stitch the tendons and their sheaths, in this amputation, to the periosteum and the theca, also passing one of the sutures, serving to unite the skin, through the end of



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severed tendons, he will in many instances, and especially in the young, secure excellent movement of the stump. The risk of possible stiffness should be explained to the patient, and, if he is willing to assume it, he is very likely to obtain a good result.

In every case of finger amputation the making of flaps must never be a matter of individual preference by the surgeon for some particular operation. The adoption of a special procedure must be governed by the existing conditions. If there is more sound skin left on the palmar surface, the long palmar flap is adopted, while the long dorsal flap is made if this surface is in the best condition. Equal antero-posterior flaps, and equal lateral flaps, best meet the indications in those cases in which the condition of the cutaneous surfaces allow of their employment.

Amputation through the metacarpo-phalangeal joint, when the whole finger is to be removed, should



FIG. 34. Amputation through a phalanx.

be the invariable rule in all patients who do any work requiring any degree of manual strength. The hand thus maintains its normal width, and the transverse

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ligament is little, if at all, interfered with, so that the hand is very little weakened. On the other hand, if appearance and symmetry are the chief considerations, the head of the metacarpal bone should be removed. The hand is thus narrowed and the loss of the finger becomes less noticeable. Whichever one of these operations is adopted, it is an absolute rule, whenever possible, not to interfere with the tissues of the palm. The section, in either case, should be made obliquely from above downwards, and from behind forwards, that as little as possible of the palmar aspect may be removed. The digital vessels lying deeply opposite the web of the finger must be sought and ligated, since, especially if inflamed, they are apt to cause secondary bleeding. If the middle or the ring finger is the one to be removed, never bandage the fingers on either side tightly together, as

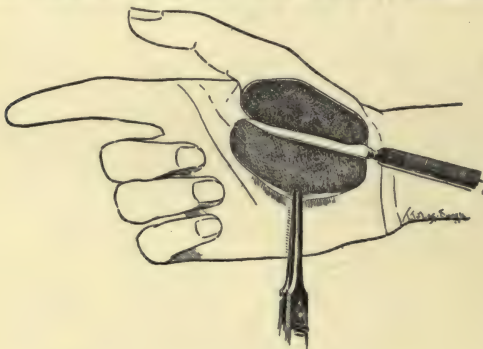


FIG. 35. Amputation of the thumb.

these fingers may assume a tendency to point toward one another or even to cross at the tips.

*Amputations of the Thumb.*—The loss of the thumb is, as compared to that of any one of the fingers, of so much greater functional importance,

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that the surgeon cannot make too many efforts to obtain conservative results. Resection of either one of its phalanges leaves quite a useful thumb, whereas resection of the proximal or middle phalanges of the fingers is rather apt to result in a very useless digit. The head of the metacarpal bone of the thumb must never be removed if this can be helped, as it is capable of serving a most useful purpose. In amputation of either one of the phalanges of the

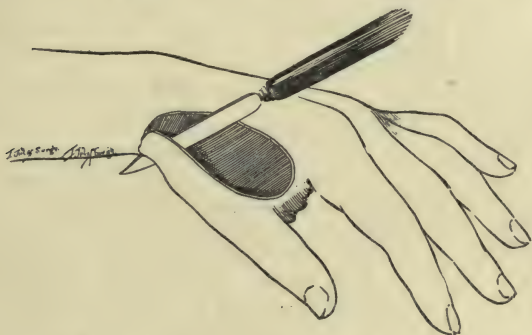


FIG. 36. Amputation of the thumb.

thumbs it is most important that the cut end of the flexor longus pollicis should be sutured to the periosteum and theca, and to the angle of the incision, if lateral flaps be made, or to the anterior flap, in case of antero-posterior covering.

*Excision of Finger-Joints.*—We have seen that resection of phalanges, excepting in the thumb, gives very bad results. This, however, is not true of excision of the joints. This operation, which is most frequently done for disease, is performed through an incision carried enough to one side of the dorsum of the finger to avoid injuring the extensor tendon. The surgeon next cuts through the lateral ligament

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and dislocates the joint. The ends of the bones are then resected with a thin saw, or with sharp cutting forceps, taking care to avoid any injury of the soft parts. It is usually well to provide drainage of horse-hair or fine silkworm gut, and to avoid closing the wound completely. Dress over a splint in a

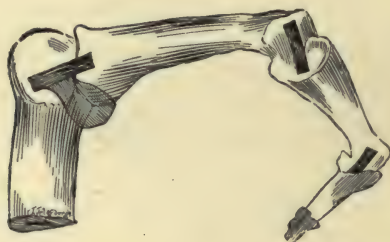


FIG. 37. Position of the joints of the fingers.

slightly flexed position, and begin passive motion before the end of a week. If the soft parts have not been too much damaged, a very useful finger will result, with a pseudarthrosis capable of a very fair range of motion.



## THE LOWER EXTREMITY.

### THE LOWER EXTREMITY.

#### THE LEG AND GROIN.

*Ulcers of the legs.*—The older writers on surgical topics appeared to vie with one another as to which could discover the most numerous varieties of ulcers of the leg. From the standpoint of the practical surgeon it is quite sufficient to consider ulcers of the legs as belonging to two kinds—to wit, the syphilitic and the non-syphilitic. The first variety and the second are by no means always easy to differentiate by mere observation, and it is only the clinical history, with the presence of characteristic old scars, or the failure of ordinary treatment to benefit the patient, which in many instances awakens the suspicion of the surgeon. The writer is becoming daily more strongly persuaded that many people, and especially old people, are honestly ignorant of the fact that they have had syphilis. This is particularly true in women. In many instances the use of the mixed treatment will rapidly promote the healing of ulcers that have long proved rebellious to other treatment.

Non-syphilitic ulcers are practically all due to disturbed nutrition, whether originating from a traumatism or developed spontaneously. There invariably is an imperfect return of venous blood in the extremities, whether due to varicose veins, to ordi-

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nary malnutrition from any cause, or to a weakened general circulation.

Like ulcers anywhere else, those affecting the legs may take on many forms, all of which are really nothing but modifications of two conditions—*i. e.*, sluggishness and irritability.

*Treatment.*—In the very large majority of non-specific leg ulcers, varicose veins are at fault, and any treatment that fails to check the influence of the varicose veins must needs prove tedious and unsatisfactory. For this purpose, rest, if it can be indulged in, and the use of the ordinary roller bandage, or, better still, of the Martin rubber bandage, or of the elastic stocking, must be joined to the local treatment of the ulcer. If sluggish, it is to be excited to a more active condition. If irritable, it must be subjected to emollient applications. The sluggish ulcers occur in by far the greatest numbers. If prudently employed, the ordinary curette or Volkmann's spoon give excellent results. The whole ulcer should be thoroughly scraped, the bleeding checked with hot water, after which the sore is dressed in one of the ways described further on. If, when first seen, the ulcer is a festering, pus covered sore, it is best to cleanse it thoroughly, preferably with peroxide of hydrogen, and to dress it with a large wet dressing, protected by thin rubber or oiled silk, and thoroughly moist with ordinary normal salt solution. None of the ordinary antiseptics, such as carbolic acid or bichloride solutions, are allowable, as they are very apt to cause eczema, or to increase it if already present. At the next dressing, the ulcer will be found much cleaner and healthier looking. The use of a strong solution of nitrate of silver (gr. xx- $\frac{3}{4}$  j) or of protargol (gr. xxx- $\frac{5}{8}$  j), or of chloride of

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zinc (gr. xx- $\frac{3}{4}$ ), thoroughly painted all over the sore, is now strongly recommended. If any of these manipulations should be too painful, the previous use of a few drops of strong cocaine solution brushed over the ulcer will to a considerable extent diminish the pain. After the application of the silver or zinc salts, the ulcer is to be dusted with one of the milder antiseptic powders, such as boracic acid, or boracic acid with acetanilid, in equal parts, or the latter mixture with five per cent. of salicylic acid. Cleansing, with the application of the silver salts, followed by the use of one of these powders, with a covering of gauze or lint, and bandaging the whole leg, from the toes upwards, will often give most satisfactory results, if repeated once or twice a week. We spoke above of the careful use of the curette, for the reason that its injudicious employment may result in opening a vein, sometimes giving rise to considerable bleeding. If this should occur, however, pressure and elevation of the limb will soon check it.

If any eczema exists, the whole eczematous surface may be dressed with Lassar's paste, while the ulcerated spot is treated as mentioned above. Ointments should not be used upon the sore, as they are seldom surgically clean, and because they hinder the absorption of the secretions by the dressings. Moreover, it is well known that the admixture of any antiseptic with a greasy or oily substance greatly diminishes the antiseptic action.

A certain number of ulcers may heal under the application of iodoform or any of the other iodine derivatives, but this mode of treatment is often unsatisfactory. These substances may all prove too irritating in individual cases; they are prone to favor the production of eczema or erythema, and, in other

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instances, appear to possess but a comparatively small tendency to promote a healthy action.

If an ulcer of the leg should seem to be the seat of an active pyogenic infection, as is sometimes the case, it must be thoroughly cleansed, one of the silver salts applied, and then the sore and neighboring parts should be covered with ichthyol ointment, ten per cent., until a healthy action becomes manifest.



FIG. 38. Method of strapping an ulcer of the leg.



FIG. 39. Incisions for varicose veins of the leg.

Strapping the ulcer is a good form of treatment in ambulant cases. Strips of plaster about an inch wide are applied around the leg, covering the ulcerated surface, which must be protected by means of a sheet of absorbent gauze. The whole leg must, however, be well bandaged from the toes to the knees, or



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else the constriction caused by the strapping will not only produce much discomfort, but may also be a source of danger by greatly diminishing the return circulation. The use of a thin rubber bandage is far preferable to strapping, but the cost of these bandages precludes their adoption in dispensary practice. In private work, however, their employment gives excellent results. The patient must be taught to apply them himself, as they should be removed every night and replaced in the morning.

In the cases in which varicose veins are very prominent factors in the production of the disease, nothing but a thorough operation upon the veins themselves will prevent frequent recurrence of the ulcers. While this operation cannot come under the heading of minor surgery, we will here consider it briefly, since its employment is often really necessary for the cure of bad and recurrent cases. The simplest operation consists in tying the saphena high up the thigh, and in some cases it may suffice to bring about a cure. The only procedure which may be considered as a radical one, however, is that by which all the enlarged veins are tied and resected. The writer has operated in this way about forty times in the last three years, with invariably good results, both in ulcer cases and in patients simply suffering from varicose veins. An incision is begun at a point about five inches below the knee-joint, and over the inner border of the tibia, and carried circularly across the inner and posterior aspect of the leg, to a point on the same level at the middle of the calf, or even beyond this point, if necessary. If any large veins are cut while making this incision, they may bleed severely, but this may be stopped by pressure, or the veins may be caught with pressure

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forceps. Most of the veins, however, will be seen crossing the field of operation. The retraction of the skin exposes an inch, more or less, of the vein, which is dissected away from the surrounding areolar tissue, pulled out as far as possible without danger of laceration, and ligated with catgut at both proximal and distal exposed ends. The piece of vein between the ligatures is then resected. In some instances as many as ten or twenty large veins will thus be tied. The wound is then carefully cleansed and closed up with horse-hair or fine catgut sutures. This operation is repeated at a point about six inches above the knee-joint, the incision running from the inner border of the rectus femoris to a point over the innermost of the inner hamstring tendons, where it arises from the semi-tendinosus. The most careful asepsis is, of course, absolutely necessary, and this operation is not to be done unless the operator is certain that he can obtain it. Extensive as the operation undoubtedly is, it is the only one, in the writer's judgment, that will certainly give good results.

Whenever treatment results, when dealing with extensive ulcers of the leg, in the production of a healthy granulating surface, skin-grafting may well be employed, with a view to shortening the convalescence.

*Bedsores.*—These lesions, while invariably due to constant pressure upon a certain point, occur most readily in people suffering from certain diseases in which the sensitiveness of the skin has been diminished or abolished. They have no spontaneous tendency to heal unless the pressure is relieved and the skin is brought to a more healthy condition. There is at first a low grade of inflammation, the skin

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assuming a reddish purple hue, then becoming still darker, finally going on to ulceration, which may involve deeper tissues, with the constant formation of sloughs which affect muscles, fasciæ, and finally periosteum, laying bare the underlying bones.

*Treatment.*—Prevention is all-important. Any patient compelled to remain long in bed, and especially if paralytic, diabetic, or suffering from painful joint-disease, must be systematically treated with a view to preventing the occurrence of decubitus. The skin over the pressure points must daily be bathed with alcohol and water, the parts carefully dusted with baby-powder, and rubber cushions, or, better still, the air or water mattress, must be employed. If bedsores have already formed, frequent changes of position, and careful antiseptic treatment must be employed. It is well to remember that people whose bed is kept wet with urine, as in some cases of paralysis, and others suffering from insanity, are peculiarly liable to the very rapid occurrence of bedsores.

*Bursa Patellæ.*—This is a chronic enlargement of the patellar bursa, due, as a rule, to external irritation; hence, the common name “housemaid’s knee.” The increase in size is due to the accumulation of fluid within the bursa. This fluid may be quite thin and watery, or else, and especially in cases that have lasted a long time, it may be of a syrupy or even gelatinous consistency. When these cases are seen comparatively early, it may be possible to cause the enlargement to subside by the use of external counter-irritants, or by persistent compression by strapping. These means should not, however, be persisted in very long. They give but a very small percentage of successes at best, and most commonly

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utterly fail in giving relief. In order to empty these bursæ, the skin should be drawn over to one side of the sac, which is firmly held by the fingers. A fair-sized tenotomy knife is then inserted through the skin into the sac, which is then emptied by pressure. When it is entirely empty the bursa may be washed out with a weak solution of iodine or chloride of zinc, after which firm compression should be made by strapping or bandaging. This is to be kept up for some days.

Suppuration of these sacs sometimes takes place. This complication may result from failure of asepsis in the operative treatment, or prior to operation through causes that are generally ill-defined. It may also arise in a bursa that has never been enlarged. The treatment, of course, consists in thorough and immediate evacuation. Neglect of this measure may lead to exceedingly bad results, utterly out of proportion to the severity of the original lesion. Necrosis, partial or total, of the patella, may ensue, or else the knee-joint itself may be involved. Septic conditions of the bursa patellæ call for immediate incision. If no pus has gathered yet, so much the better for the patient. No harm can arise from an early incision in such cases, whereas delay may prove most dangerous.

*Glandular Inflammations.*—Glandular and periglandular inflammations about the lower limbs are most commonly seen under the familiar form known as bubo, affecting the femoral and inguinal glands. While most commonly occurring in the inguinal region, as a consequence of venereal infection, bubo is not limited to this locality or to this cause. In children, particularly when of a so-called scrofulous disposition, the irritation of intertrigo, of phimosis,



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and even that produced by worms, all seem capable of causing inguinal bubo, while any septic condition of the feet and legs, such as a sore heel, an ingrowing nail, etc., may bring about enlargement and breaking down of the glands of the femoral group.

Femoral bubo is rare in adults, yet cases occur at times, in which septic conditions about the foot or leg are at fault. Vaccination at the leg, which is often practiced in women and female children, may cause a good deal of enlargement of the femoral glands. Inguinal bubo occasionally seems, in adults, to be due to herpetic eruptions about the glans or corona, or to the irritation due to piles, or to anal condylomata. The very great majority of such cases result, however, from gonorrheal infection. Chancroids are the next most frequent causes. Chancre is comparatively infrequently followed by the occurrence of bubo.

The treatment of these glandular enlargements varies according to the condition they have reached when first seen by the surgeon. Femoral enlarged glands comparatively rarely go on to suppuration. Treatment of the condition of the foot or leg which causes them generally brings about their subsidence. If there is a large inflamed vaccine sore, it is well to remark that such a sore should always be treated as any similar condition due to other forms of sepsis, *i. e.*, by the application of a large wet dressing of some antiseptic fluid. If a femoral gland should go on to suppuration it must be opened and treated like an inguinal bubo.

When the inguinal glands are merely somewhat tender and enlarged, rest and application of iodine may possibly suffice to cause the inflammation to disappear. If, however, there is any evidence, within

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one or two days, that the process continues, other methods must be adopted. Wherever it is possible a thorough enucleation of the glands will ordinarily prove most advantageous to the patient, by preventing subsequent extension, and causing a rapid healing by first intention. If the glands have broken down already, so that it is not possible to enucleate them thoroughly, a wide incision should be made, all broken down tissue is to be curetted away, the wound washed out with peroxide of hydrogen, and a large wet dressing is to be applied. Poulticing a bubo so as to encourage suppuration is a relic of the dark ages, only excusable when the patient utterly refuses any active intervention. It causes extension of the trouble, and delays thorough recovery long beyond all proper bounds.

When the bubo is first seen as a true abscess, then it is best to open it by an incision vertical to Poupart's ligament, and extensive enough to prevent any danger of premature closing of the wound. It is then thoroughly washed out and loosely packed with iodoform or other aseptic gauze, under a wet dressing. Whenever an operation has been done under anæsthesia, and the glands are much broken down, the use of pure carbolic acid followed in a minute by washing out with alcohol is to be recommended.

Early complete removal of the glands gives the ideal results, and, in hospital practice, is much resorted to. In these cases it often occurs that the patients are up and about in a week or ten days after the operation.

*Fistulous Tracks in the Groin.*—We are sometimes consulted by patients suffering from fistulous tracks in the inguinal region. These fistulæ mostly

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result from bubos that have opened spontaneously, or in which the practitioner has made an insufficient opening. Like fistulæ elsewhere in the body, they can only be cured by being thoroughly opened. In the groin they are apt to burrow most extensively, and a very thorough operation is often necessary to bring about a cure. The writer is in the habit of injecting such tracks with a strong solution of blue pyoctanin, or with permanganate of potash, in order to deeply stain all the channels, which are then dissected out carefully.

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In the minor surgery of the foot, owing to the protection afforded by shoes, we find but a small number of wounds, as compared with the hand. Again, as the smallest injury to the foot is apt to result in some temporary difficulty of locomotion, even if only due to the pressure of the shoe upon a sore place, such hurts are apt to be taken better care of than similar injuries to the hand, and septic conditions are, therefore, more rare than in the latter region.

*Contused Wounds.*—These are by far the most numerous traumatisms affecting the foot, and range from the most trivial hurts to injuries attended with the most varied complications. Most common among the latter, are partial or total avulsions of the nails, cutaneous lacerations, sprains of the phalangeal articulations, ecchymoses and hæmatomata. Such wounds nearly always affect the dorsal surface of the feet and toes.

*Treatment.*—The affected foot is thoroughly washed, after which hot or cold compresses will prove useful.

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Compression of the whole foot with a rubber bandage, not too tightly applied, is apt to afford marked relief, if applied soon after the receipt of the injury. If the skin is anywhere injured, wet antiseptic dressings, preferably bichloride, should be used. After a severe bruise the vitality of the tissues may be much interfered with, and the smallest wound affecting the skin may become a starting point for lymphangitis, the most common of the septic conditions affecting the foot. Simple ecchymosis demands no especial treatment. Hæmatoma is rare in the deep tissues, but considerable collections of blood just beneath the skin often enough take place, as a result of crushing injuries in which the skin itself has been protected by the shoe, but more or less extensive laceration has occurred in the subcutaneous tissues. If the skin is quite unhurt, such collections are not interfered with by the surgeon, as a rule. Compression and rest for a few days commonly suffice, and massage will prove an excellent adjuvant to the measures already mentioned. The existence of the hæmatoma, if the skin is at all injured, makes the use of copious antiseptic wet dressings imperative. Any evidence of sepsis, however slight, if not rapidly checked by the wet dressings, indicates the need of opening into the collection, thorough washing out, preferably with peroxide of hydrogen, and daily dressings. If these measures prove insufficient to entirely check the septic collection, the use of prolonged foot-baths can be adopted. This, however, is far more difficult to accomplish than in the case of the hand, and, if the patient is at all restless, or if the dependent position of the foot increases the pain, we must think of other measures. The author has had some excellent



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results from the adoption of a comparatively small wet dressing covering the site of the wound, while all the rest of the inflamed area is thickly coated with ichthyol ointment. The employment of Crede's silver ointment also gives good results, but in many cases its expensiveness precludes its use. We will consider this matter at greater length under the heading of septic conditions of the foot.

*Incised Wounds.*—Incised wounds of the dorsal surface are very frequently quite deep, and often implicate the tendons, bones and articulations, as they are most frequently inflicted by the fall of some heavy tool upon the part, or by an inaccurate blow of an axe. Wounds of slight importance need but the usual thorough cleaning out, with or without suturing of the skin, according to the extent of the incision. If one or more tendons have been severed, the ends should be approximated by catgut sutures. If extensor tendons are cut in the neighborhood of the metatarso-phalangeal joints, it is often necessary, owing to considerable retraction of the distal end, to incise the skin down as far as is needed in order to secure the retracted end and suture it. Failure to adopt this procedure permits of a dropping of the toe, converting it often into a regular hammer toe. When the tendon is properly sutured the toe must be placed for some days in a condition of over-extension, most easily secured by a bandage passed under it, acting like a stirrup, the ends being fastened by several turns above the ankle.

Incisions implicating joints are carefully cleansed by flushing the joint out with copious quantities of saline solution, and closing the wound with very few stitches. Such injuries should be examined daily, and any sign of sepsis must be considered as an in-

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dication for immediate removal of the stitches, followed by active antiseptic dressings kept wet under a sheet of rubber protective.

Cuts of the plantar aspect are not often very extensive. They are most frequently incurred in stepping upon some sharp instrument or walking upon glass, especially while bathing. The author has seen but one case in which the plantar arch was wounded, in a farmer who stepped upon a scythe-blade. In this case the tendon of the flexor longus pollicis was also severed, and had to be sutured.

*Punctured Wounds.*—These are usually deep when affecting the dorsal aspect, being commonly caused by a falling instrument or tool. In the plantar region they are of every degree of severity, from the most minute puncture to perforations running between the interosseous spaces and passing through the dorsal skin. The most frequent punctures are those caused by stepping upon needles and pins and tacks. These wounds are commonly of no importance unless the foreign body is broken off in, or entirely penetrates the foot. If the patient is seen a very short time after this has occurred, the surgeon may operate with some confidence of finding the offending substance, but even here, if possible, it is an advantage to obtain an X-ray picture, while, in those cases in which a needle has long been buried in the tissues, this is quite indispensable. It is well to remember that in these cases the patients' impressions as to the location of the needles are most unreliable. After a radiograph has been obtained, it is most important, if anatomically possible, to make the incision at right angles to the shaft of the needle. At least two pictures should be taken, in order, if possible, to obtain some idea of the depth at which the

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needle lies. Even with all these helps, the procedure, simple though it may at first sight appear, often turns out to be one of great difficulty, necessitating a very extensive operation.

*Burns and Frost-bites.*—These are to be treated according to the principles laid down when considering similar injuries of the hands and fingers. Amputation is never advisable until treatment by antiseptic wet dressings has caused a distinct line of demarcation between the living and the necrotic tissues, when it will commonly be found that a less extensive operation is needed than first appears to be the case.

*Septic Conditions of the Toes and Feet.*—Sepsis arising in consequence of an infection of a wound may, as elsewhere, be of all degrees of severity. The treatment consists in liberal incisions of the affected parts, with the applications of copious wet dressings of bichloride. If lymphangitis supervenes, manifested by an area of redness and heat showing a tendency to extension beyond the limits of an ordinary local inflammation, excellent results are obtained by making long incisions through the superficial layers of the skin, which may then be dressed like the wound itself, or may be covered with a layer of ichthyol ointment. Septic infection affecting the plantar surfaces is often exceedingly painful owing to the thickness of the skin in this situation, and the pain can only be relieved by thorough incisions. Lesions resembling the panaritium of fingers are comparatively rare, and require the same treatment. Onychia is fairly frequent, and chiefly affects the big toe, most frequently as a complication of ingrowing nail, and occasionally as a result of the entrance of some foreign body beneath the nail. In some of the

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cases that we see, a large portion of the subungueal space is bathed in pus, and the tissues surrounding the matrix are macerated by the discharge. In these cases the nail should be cut away from its bed wherever it has been separated from the underlying structures by the formation of pus, but it should never be torn away from its matrix, owing to the fact that injuries to the latter are apt to be followed by an irregular growth which produces deformed and misshapen nails that are apt to give a good deal of trouble later on.

We see a certain number of cases in which sepsis follows the evacuation of a blister with a dirty pin or needle, or in which the blister has broken and the underlying structures have become subsequently infected. In these cases the uplifted skin is entirely cut away, and the part is placed in an antiseptic dressing.

*Syphilitic Lesions.*—Syphilis is responsible for a certain number of affections of the toes and feet. Mucous patches and cracks, or rhagades, are occasionally found, especially in uncleanly people, or those whose feet perspire a good deal, occupying the spaces between the toes. The treatment of these consists in daily washing, followed by greasing the parts with blue ointment or the ointment of the oleate of mercury. If this is objected to, the spaces between the toes may be kept thickly powdered with naphthol, one part to a hundred parts of starch. This, in conjunction with active internal anti-syphilitic treatment, will often suffice.

Gummata, specific osteitis, and various forms of syphilitic ulcerations and onychia, may also be observed in this region.

*Tubercular Lesions.*—The writer has seen two in-



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stances of tubercular osteitis of the toes, and lupus occasionally affects the foot. Onychia is rarely due to a tubercular lesion of the matrix, but some cases have been observed. For the treatment of these conditions the writer would refer readers to the pages dealing with similar affections of the fingers.

*Tendinous Synovitis.*—This condition is occasionally met with, especially in the tendinous sheaths in the region of the instep. The simple variety seldom give rise to much trouble, although in a few instances they have been known to suppurate, necessitating incision. Treatment is the same as for similar conditions affecting the hands or wrists. Fungous tenosynovitis is of a tubercular nature. In these cases simple incision is useless, or even harmful, inasmuch as it affords a possibility of pyogenic infection. The incision should be followed by a thorough curetting of all the fungous material and the removal of the affected sheath, after which the resulting wound is to be thoroughly swabbed out with chloride of zinc solution (gr. XL to  $\frac{3}{4}$  i) and dressed antiseptically.

*Osteo-arthritis.*—This condition is commonly of tubercular origin, although in a few instances syphilis is responsible. When the toes are affected by white swelling amputation or resection is commonly required. Ordinary arthritis is usually rheumatic or gouty, and sometimes gonorrhœal. In these cases the big toe is commonly the one affected.

*Chilblain.*—This affection, known as *pernio*, is most commonly found upon the feet and toes, although the hands and fingers are not always exempt from it. It differs from frost-bite in that, unlike the latter, it does not appear to result from the immedi-

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ate effect of cold, but is the result of a combination of low temperature, generally associated with moisture, and of some constitutional defect, such as malnutrition and anæmia. It is most common in children. Young girls approaching the period of puberty are not infrequently affected. Among adults it is comparatively rare, but far more often seen in the female than the male sex.

Chilblains occur under the form of an erythematous inflammation, in which the skin commonly swells to a considerable extent, sometimes breaking in the form of crevices, which may go on to a considerable degree of ulceration. Itching and burning are always marked. In bad cases the swelling of the toes, and sometimes of the fingers, is such as to suggest the appearance of sausages. In these cases there is much œdema, often associated with the effusion of some blood under the skin.

*Treatment.*—Attention to the general health is naturally indicated. Next in order is the avoidance of cold, especially when associated with dampness. For local use a host of time-honored remedies exist, including the application of such substances as milk, weak vinegar, wine and even freshly passed urine. Acetate of zinc, one drachm to a pint of water, gives very rapid relief. Among the many remedies that have been recommended, the writer has obtained the best results with resorcin, as in Boeck's formula, consisting of one part each of resorcin, ichthyol and tannic acid, with five parts of water. If the staining produced by this mixture is objected to, as when the hands are affected, the same writer recommends resorcin eight parts, acacia five parts, talcum two parts, and water fifteen parts, to be applied every evening. Both these mixtures must be well shaken.

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*The Toe-Nails.*—We have already seen that ingrowing toe-nail is one of the main causes of inflammation of the matrix. This inflammation is one of the causes of hypertrophy of the nail. The other most frequent cause lies in simple neglect, which seems most common in the older people of the lower classes. In some marked cases of hypertrophy of the toe-nails the patients acknowledge the fact that it is many years since they cut the nails. The mere pressure of the shoe upon these long nails often appears to suffice to produce a slow and nearly painless alteration in the action of the matrix, resulting in the gradual production of enormously hypertrophied nails. These sometimes give rise to practically no trouble, as is often the case in old people whom we see in hospitals when admitted for other reasons. In other cases, however, the enormous hypertrophy gives rise to an inflammation of the matrix. This may sometimes be successfully treated by removing as much of the enlarged nail as possible, often necessitating the use of a small saw or strong cutting forceps. As this relieves the pressure of the shoe the inflammation sometimes promptly subsides. Where the inflammation is severe, however, and there is any production of pus, the whole nail must be removed.

When hypertrophy is of the slighter degrees, or where there is any tendency to curving in of the lateral edges, the nails should be kept trimmed as short as possible straight across the outer edge, but the lateral edges should never be cut away. Packing some fibres of cotton beneath the outer edge will suffice to protect the underlying tissues.

*Ingrowing Nail.*—In this condition the tissues lying beneath one or both of the lateral margins of the big toe become more or less hypertrophied,

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with subsequent inflammation, producing painful granulations which are bathed in secretions which, at first simply serous, may at any time become purulent. In bad cases the whole lateral fold is converted into an exquisitely painful ulceration. It is not very unusual, in the practice of the larger hospitals, to see cases of severe lymphangitis of the foot or even of the whole lower extremity, which have originated on account of the existence of a suppurating ingrowing nail.

*Treatment.*—The treatment is essentially surgical, but a vast number of measures is at our disposal. It will sometimes suffice to show the patient how to cut the nail properly, and to pack a little cotton beneath the margin on the affected side. The application of a strong solution of nitrate of silver will greatly assist the healing of the inflamed tissues. The use of silver or tin-foil under the margin of the nail is sometimes very effective, but it is not as easily introduced as the cotton, although the use of the cotton packing, gradually increased in amount, may so lift the nail as to permit the introduction of tin-foil later on. The nail should be scraped down as thin as possible.

The radical cure by operation gives us the choice of many methods, but only a few can be described here. Total avulsion was formerly most employed, but has now deservedly become obsolete. It left the toe uncovered for a long time, and the injury to the matrix was nearly bound to result in a misshapen nail that often gave as much trouble as the original condition for which the operation was done. The writer believes, in principle, that no operation is efficient that fails to remove and entirely obliterate the matrix upon the affected side or sides. If this



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object is accomplished, the operation will be successful. The writer has on several occasions, for the benefit of students or of his house-staff at the hospital, done four different operations on one patient, in which both sides of each big toe-nail were affected, and obtained equally good results all around.

*Operations for Ingrown Nail.*—Ingrown nails are frequently in a very septic state, and it is always the part of wisdom, if possible, to treat this condition for a few days before operating. The writer has operated on hundreds of cases in dispensaries, under cocaine, and sent the patients walking home shortly after, without ever being cognizant of a bad result, and yet in a case treated in hospital, with every antiseptic precaution that could be devised, the patient came near dying of septicæmia, and was compelled to remain in the hospital for several months before he entirely recovered. If possible, therefore, the toe should be treated with an antiseptic wet dressing for some time before the operation, after a thorough cleansing with peroxide of hydrogen. Then, after local or general anæsthesia has been induced, the affected tissues are painted over with a small pledget of cotton dipped in pure carbolic acid, which is then removed by washing with alcohol. The patient is then ready for operation.

The number of operations that has been devised for ingrowing toe-nails is exceedingly large, and the writer purposes to describe those only which his experience has taught him to regard as possessing the greatest value. These are the Cotting operation, the Anger operation, and the wedge operation. There is no operation that so invariably gives good results as a properly performed ingrowing nail

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operation, and none that gives rise to such disappointing results as one that fails to thoroughly achieve the chief object, namely, the thorough removal of the matrix. Each of the above named procedures does this perfectly, if properly performed.

*The Cotting.*—This procedure consists practically in a complete removal of the affected edge of the toe, including the fold, a part of the nail and the matrix. A narrow-bladed knife is used to transfix the lateral fold, the point coming out upon the side of the plan-

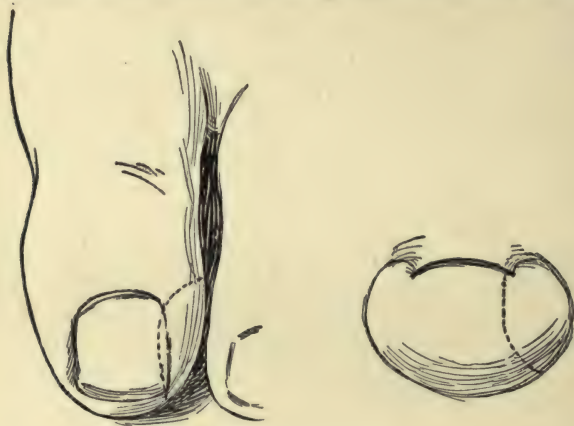


FIG. 40. Cotting operation.

tar surface of the toe. The edge of the knife is directed upwards, and cuts out a flap extending a quarter of an inch above the proximal edge of the nail. This flap is then seized with forceps, the blade of the knife is directed downwards, still cutting along the edge of the nail, and the entire edge is thus removed. The edge of the nail, including the matrix, is removed by a sweep of the knife along the affected side of the bone. This operation, at first

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sight, seems so radical as to appear quite brutal, yet it affords the best results when well done, and the large surface left to granulate gives much less trouble than would commonly be thought to be the case. All these operations are done with constriction by a rubber band, at the root of the toe. The bleeding is really slight, and it is seldom that any small arteries have to be tied or twisted. The raw surface is covered with an antiseptic powder, and the toe is dressed with gauze and then with rubber protective. Then a narrow bandage is firmly applied, after

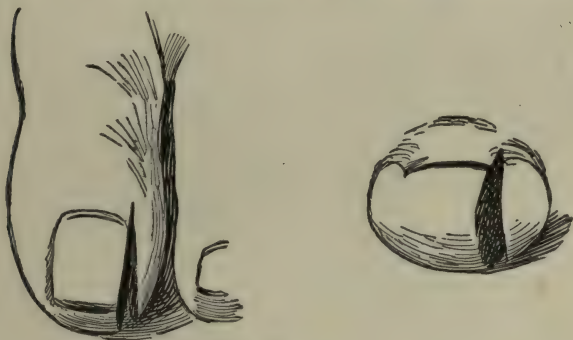


FIG. 41.

Anger's operation. Wedge removed; ready for stitching.

which the constricting rubber band is removed. The protective will prevent the blood from coming through the dressing and final bandage, a great advantage from the double standpoint of appearances and antiseptis. The dressing should be changed on the next day. The materials under the protective will be found soaked in semi-dried blood, which is then washed away with peroxide of hydrogen. The dressing with an antiseptic powder is repeated, but no protective is applied unless there should be some

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evidence of sepsis. Patients can usually walk about in slippers or a shoe that has been cut away at the side, within two or three days.

✓ *The Anger Operation.*—The knife cuts a flap consisting of all the lateral part of the toe, not including the fold, and running up to a quarter of an inch beyond the proximal transverse edge of the nail, as shown in Fig. 41. Then another sweep of the knife shaves off all the tissues up to the bone, including the side of the nail and the matrix. The flap is



FIG. 42.

Top of toe, showing  
flap sutured.

Side of toe, showing  
flap sutured.

then adjusted to the raw surface with stitches, as shown in the illustration. In this operation the object is practically to remove a complete wedge, consisting of the fold, side of nail and matrix. The writer considers it inferior to the Cotting where there is extensive ulceration and the constant formation of pus, but superior to it when the prospects are favorable for an aseptic result.

*The Wedge Operation.*—In this procedure a long wedge is removed from the upper lateral aspect of the nail. The incision nearest the mesial line



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removes the edge of the nail and matrix, while the further one removes the fold. This operation is useful in minor degrees of ingrowing nails, but often proves unsuccessful because the operator fails to make the incision nearest the mesial line deep enough and close enough to the bone.



FIG. 43. Wedge operation.

Top of toe, showing  
wedge removed.

End of toe, showing  
wedge removed.

The writer believes that these three operations suffice to meet every case that presents itself, but insists upon the fact that every operation is good that fully meets the object of thorough removal of the matrix on the affected side or sides.

Corn.—This troublesome affection is so common that it is rather the exception to meet with a civilized adult who has not one or more of these callosities. Entire extirpation with the knife is nearly impossible, unless an unjustifiably thorough operation be resorted to. Prophylaxis should take the form of wider and softer shoes. Keeping the corn pared down closely is often all that is needed to make this

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little infirmity quite bearable. If the thickened epidermis is steadily softened and then curetted away, corns may often be entirely cured. For the purpose of softening, the careful use of glacial acetic acid, applied so that none of it reaches the normal skin, or the repeated employment of a saturated solution of salicylic acid in alcohol, or in collodion, followed by the thorough use of a sharp curette, will often cause corns to disappear entirely.

*Blisters.*—Blisters appear upon the toes and heels, and sometimes upon the ball of the foot, commonly as a result of the prolonged friction of an ill-fitting shoe. While they seem like trivial affairs, the presence of a blister may temporarily quite disable a man from walking—a matter of importance to those compelled to use their feet a great deal, like soldiers, postmen, etc. The careless evacuation of a blister may lead to severe sepsis, and this trivial operation should be properly and carefully performed. The best way to do this is to take an ordinary sewing needle, which should be passed several times through a flame in order to secure asepsis. A burning match will be quite sufficient. The foot must be properly washed and cleansed, and the needle is introduced at a point about a quarter of an inch from the margin of the blister, if possible where the skin, being somewhat callous, allows this to be done without pain. The needle is then pushed until its point may be seen beneath the raised skin of the blister. The needle is then withdrawn, and slight pressure upon the blister will empty it through the tiny channel thus made. In this way there is no danger of the blister's breaking and leaving a raw surface. In some cases this little operation may have to be repeated, as the blister will fill again. This, however, may be pre-

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vented by painting a little contractile collodion over the surface of the blister.

*Sprains.*—The metatarso-phalangeal joints may all be sprained, and, as a rule, rest with some massage of the affected joint is all that is needed in the way of treatment. The inter-phalangeal joints are very seldom sprained, owing to the shortness of the levers formed by the phalanges. *Sprains of the ankle* occur with great frequency, and are often quite important injuries. It is well here to remind the reader that a true sprain is always attended with a greater or lesser degree of ligamentous laceration, that this laceration causes the effusion of more or less serum and blood within or about the joint, that torn ligaments, owing to their inconsiderable blood supply, do not tend to heal with great rapidity, and that the treatment must, therefore, have several objects. In the first place, we must limit as much as possible the amount of effusion; then we must so place the joint that an incautious movement will not cause greater laceration, while it will still be able to move freely within certain limits. The writer has chanced to have had a very large experience in the treatment of sprained ankles, and desires to declare at once his belief that the only method which perfectly achieves these various requirements is that first published by Dr. Gibney, of New York. It possesses the enormous advantage of enabling the foot to be used immediately. It limits the motion only to the exact extent required to prevent further spraining and lacerating of the injured ligaments, and it exerts a degree of pressure just sufficient to aid in causing absorption of effused fluids within or around the joint.

The majority of sprains involve the outer aspect of the ankle-joint, and the middle fasciculus of the ex-

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ternal lateral ligament is the structure most frequently torn partially or entirely across. The anterior fasciculus is more apt to suffer than the posterior one. The reason why the external aspect is so much more frequently sprained than the internal, probably lies in the fact that the internal lateral or deltoid ligament is so much stronger a structure than that formed by the fasciculi of the external that it requires a great deal more force to produce internal than external laceration. As a matter of fact we know that great sudden tension applied to the internal lateral ligament will often tear off a portion of the inner malleolus without producing laceration of any ligamentous fibres.

*Treatment.*—If in the presence of an ankle sprain the surgeon is for any reason unable to apply Gibney's dressing at once, the application of cold, or of very hot water, or, better still, of a large dressing, wet with lead and opium wash, will give relief. Temporary bandaging from the toes with a wet bandage or an elastic rubber bandage will limit the amount of effusion. As soon as possible thereafter the Gibney dressing should be applied, as it is indicated early or late. When properly done, and renewed whenever from the subsidence of the swelling it may become loose, or for purposes of massage and passive motion, its employment will prevent the occurrence of so-called chronic sprain. The latter condition is one in which the articulation remains sensitive to changes of weather, in which a slight degree of swelling becomes more or less permanent, and in which any unguarded motion is apt to bring about a condition less intense, than but recalling, the primary injury. From the writer's experience with the Gibney dressing he has become convinced that a chronic sprain is nowadays



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evidence either of neglect on the part of the patient to submit to the proper treatment or on the part of the surgeon to apply it.

*The Gibney Dressing.*—Strips of adhesive plaster are provided, an inch to an inch and a half in width. The first straps used are about eighteen inches long. The first is started about four inches or five inches



FIG. 44. Gibney's Dressing for sprained ankle. The first set of straps.

above the malleolus on the affected side. It runs down by the edge of the tendo Achillis, passes across the sole of the foot diagonally to the base of the big toe, if it is an external sprain, and to the base of the little toe, if the sprain be an internal one. A number of these straps are applied in the same way, each one slightly overlapping the last, until the whole outer (or inner, as the case may be) side of the ankle is covered. This having been done, another series of straps is applied as follows : The middle of the strap

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is placed at the point of the heel, and the ends are carried to a point on the foot at the junction of the metatarsal bones and the tarsus; other strips are applied above this until the ankle joint is covered in. As will be noticed in the photographic reproduction they do not meet in front so as to constrict the foot. The whole is then covered with a



FIG. 45. Gibney's Dressing for sprained ankle. Same as FIG. 44, showing how the straps run diagonally across the sole, to the base of the big toe.

neat gauze bandage, and if the dressing has been properly applied, the patient finds himself able to walk upon the injured foot, and should be encouraged to do so, at first to a limited extent only. If the patient is very fat or heavy, a wide strap passing under the sole and up along the side of the leg, nearly

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to the knee, will act as an additional stirrup, and support the foot more firmly. The use of this dressing gives such good results that sometimes hardly anything else is needed, yet the use of passive motion and massage should never be neglected. There is no principle so clear in the writer's mind as that formulated in the statement that any treatment of a strained or dislocated joint which does not include frequent motion to the full extent of the natural movement of the joint must give imperfect results.



FIG. 46. The second set of straps applied.

*Chronic Ankle Sprains.*—Whenever the surgeon has to deal with a so-called chronic sprain, he must study out the amount of limitation that has been caused by adhesions, and these must be forcibly broken up. This will commonly entail the use of general anæsthesia. The Gibney dressing is then applied, but should be removed within a couple of

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days for massage and motion, and then reapplied. If the patient's consent cannot be obtained, massage and passive motion must be persevered in, and the use of the galvanic current will often prove very useful. If there is any wasting of the muscles the faradic battery must be employed.

*Hallux Valgus.* Bunions commonly occur at the site of, or below the metatarsal joint of the great toe, and the term hallux valgus signifies that the bunion occupies one of these situations. The word bunion, however, simply refers to enlarged bursæ anywhere upon the foot. As the great toe is thrust



FIG. 47. Shows the appearance in front of the second set of straps.

away from the mesial line of the body, usually by the action of narrow soles and high heels, the metatarsal joint becomes prominent, and is thus exposed to undue pressure and friction, producing more or less inflammation of the normal bursa, or of one that is developed adventitiously. The inflammatory process may recur again and again, and in some instances, suppuration will take place. When this results in the production of an open fistulous track,



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the so-called "perforating ulcer" is commonly established. We will again refer to this lesion later on.

*Treatment.* This condition is one that is so chronic, and decided painful inflammation is so comparatively rare, and usually of such slight severity, that only a few cases are seen by the surgeon when compared with the frequency of this affection. Poultices and hot wet applications, with rest to the part, and the application of a strong solution of nitrate of silver, or iodine, will often suffice to rapidly subdue the inflammation, and this will commonly be all that the patient will consent to have us do. If suppuration has occurred it should be treated like any other abscess, and in two recent instances of this kind the writer has applied the method advocated by A. M. Phelps in the treatment of suppuration of larger joints, namely, the use of pure carbolic acid allowed to remain for about two minutes in contact with the suppurating surfaces, followed by thorough washing out with alcohol. If the bunion gives but little trouble, the application of the circular bunion plasters found in the shops, or of several thicknesses of adhesive plaster cut in the shape of a horse-shoe, will give comparative comfort. Wearing wider shoes with low heels is to be recommended in all cases.

Severe cases often require operative procedures, and of these there is a large choice. If the bursa has not suppurated, it may be penetrated with a strong hypodermic needle, through which the fluid is allowed to run out. The syringe may then be fitted on to the needle and a few drops of iodine can be injected, but even this method is not entirely free from danger in the form of severe inflammation. In

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most instances an osteotomy of the metatarsal bone will give the best results. An incision about a half-inch long, or slightly longer, is carried longitudinally along the inner surface of the first metatarsal bone, in such a position that the middle of the incision will correspond with the shaft of the bone at a point just back of the phalangeal end. A simple section through the bone at this point will sometimes



FIG. 48.

Incision for Fowler's operation.

suffice to permit the operator to pull the big toe inward, *i. e.*, towards the mesial line of the body, in a position continuous with that of the metatarsal bone. More frequently, however, the surgeon must resect at least a quarter of an inch of the bone, when the digital extremity will more easily turn inwards. Opening the joint, with resection of the articular ends, has been practiced often enough, yet the operation cannot be recommended, both owing to the fact

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that the chances of sepsis are much increased, and that the longer incision required is in the place most subjected to pressure, thus often giving rise to a painful and irritable scar. If there appears to be any really good reason for opening the joint, the operation devised by Fowler is by all means the best. In this procedure the incision is made in the soft parts between the great and the second toe, so splitting the tissues that the joint is exposed on the side adjacent to the second metatarsal bone, opening the joint and throwing the phalanges outwards so as not to disturb the ligaments upon the outside and to make no cicatrix upon the outer side. The head of the metatarsal bone thus being exposed, it is resected and the parts are then replaced. There is no question that this operation, performed with every aseptic precaution, gives probably the best results we can obtain in the treatment of hallux valgus.

*Perforating Ulcer.*—A bunion, as we have seen, often enough appears to be the starting point of this disease, to which men are more frequently subject than women, probably because their occupations more frequently compel them to walk or stand a great deal. In the great majority of instances there is some underlying constitutional cause. Ataxia seems to bear the most frequent causative relation; lesions of the sciatic nerve, particularly traumatic ones, are also frequently at fault. Diabetes is not frequent. Lastly, a few cases appear to be due simply to neglect of a bunion or corn. While the big toe and the region of the head of the first metatarsal bone are by far most frequently involved, perforating ulcer is also found in other parts of the plantar surface of the whole foot. In many instances the disease extends to the bones, causing a suppurat-

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ing osteitis or osteo-arthritis, with an opening into the joint. The tissues may be affected in such a variety of ways that the curative measures to be adopted vary a great deal according to the extent of the disease and the anatomical parts involved. In slight cases the indurated skin surrounding the ulcer is shaved off, and the foot treated with an antiseptic wet dressing, or with one of the iodine derivatives. In more severe cases curetting, or dissecting out the ulcerated parts, will be indicated. In other instances amputation or disarticulation of toes will have to be done. Any operation that is adopted for the cure of a perforating ulcer must be thoroughly done, so that all the diseased tissue may be removed. Even then a certain number of recurrences will take place, especially in those cases in which the disease is of a distinctly nervous origin.

*Hammer-Toe.*—This condition is one, in which one or more toes, commonly the second or third, are contracted in the shape of a claw. The first phalanx is contracted so as to be drawn upwards on the metatarsal bone, the second being bent downwards so that the first phalangeal joint protrudes markedly above the normal level, while the last phalanx is directed forward. The most important functional disturbance caused by this state of things is the formation of a large and sensitive corn upon the angular projection formed by the first phalangeal joint. This is so troublesome that the existence of hammer-toe is considered as a reason for rejecting candidates for the army and for the police force of large cities. No mode of treatment other than a surgical operation can be considered, as nothing else can give relief. The choice lies between three operative measures. Amputation is perhaps the most certain of these, yet



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the writer is of the opinion that it should be reserved for people of later years, in which the distortion is so great, owing to the marked changes in the joint surfaces, that nothing else can give complete relief.



FIG. 49. Hammer-toe.

The next operative measure to be considered is section of the flexor tendon. This cannot, in hammer-toe, be done subcutaneously, since not the tendon alone, but also the lateral ligaments of the first phalangeal joint must be severed, as well as the contracted skin. The operation must therefore be thorough and open, and every structure which tends to assist in causing contraction of the toe must be severed. Unless this is done disappointment is certain to follow. After the operation it is indispensable to immediately place the toe in splints. It has been recommended that a padded metallic sole should be worn, in which slots are cut between the toes, that these may be tied down to the plate. As this is somewhat inconvenient and expensive, the writer has usually, after the wound was healed, placed

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a thin metallic splint wrapped in cotton beneath the toe and secured it by a strip of adhesive plaster as wide as the length of the toe and well wrapped around it.

The third operation is one that is recommended by Polaillon, and which has given him good results. The writer's experience with it has also been favorable. Two curved incisions circumscribe the corn situated upon the prominent angle, and the piece of skin with the corn is removed. A small transverse incision opens the joint, and the heads of the bones are pushed through the incision and resected. The shortening of the toe caused by this operation relieves the tension upon the flexor side. The toe is dressed and splinted, and the whole foot wrapped in an antiseptic dressing.

*Malformation of the Toes.*—We occasionally see patients in whom there is a congenital malformation of one or more toes. They may be placed in strange positions, or they may be webbed, or there may be one or more supernumerary ones. Webbed toes commonly give no trouble at all. Supernumerary and malformed toes may be amputated if they give annoyance.

*Flat-foot.*—From the clinical standpoint *pes planus*, or flat-foot, may well be divided into two varieties. It is practically always a chronic condition, but occurs as a result of constant mechanical maltreatment of the arch of the foot, as in occupations entailing long standing, especially upon hard floors, or in men whose vocations compel them to move about while burdened with very heavy weights, or else it is due to causes that produce a condition of general or local debility, such as excessively rapid growth in children, general impairment of the

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health, convalescence from acute illnesses, rickets, infantile paralysis, locomotor ataxia, and other nervous diseases. Pronated foot, so-called, is a condition giving practically the same symptoms as flat-foot, and, as a matter of fact, true flat-foot practically never occurs without a certain amount of pronation, a condition in which the foot rolls out and the inner malleolus assumes an abnormal prominence. On the other hand, pronated foot, while often mistaken for an early stage of flat-foot, may often take place with little or even, perhaps, no breaking down of the arch.

Both conditions are, to no little extent, due to poorly shaped shoes. In a shoe with a pointed toe, the big toe is inevitably deflected outward, and therefore loses some of its efficiency as the main support of the body when the heel is lifted from the ground. This throws an exaggerated burden upon the metatarso-phalangeal joint, with the final result that the whole foot is placed on the ground in an everted position. The increased weight thrown upon the inner aspect of the calcaneum and of the joint just mentioned has much to do with helping the arch to break down.

The symptoms of both these conditions at first consist in undue weariness and discomfort. The feet easily become hot and somewhat painful. These symptoms become gradually more marked, and the pain is apt to radiate up the legs and thighs. At this stage medical advice is often sought, and we regret to say that a majority of such cases are sent away with a diagnosis of rheumatism and some medicine directed against the latter complaint. It may here be stated that the arthritic diathesis is undoubtedly at fault in many instances, but unless the altered

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condition of the arch be remedied, no treatment directed against the rheumatism can be of much avail. As the malformation progresses, many patients complain of sensitive spots, the feet perspire profusely, the gait becomes awkward, and there may be enough swelling of the feet and ankles to suggest the presence of some nephritic or cardiac complication.

*Treatment.*—The operative treatment is of very little value. Neither the removal of the astragaloscaphoid joint by a wedge-shaped osteotomy, as in



FIG. 50. Plate for raising the arch of the foot.

Ogston's operation, or the removal of the scaphoid, or any other of the several operations that have been devised, can be depended on. The patients should be made to wear proper shoes, with a perfectly straight inside line. Massage and suitable exercises, in all of which inversion of the foot must be aimed at, and the adoption of supporting appliances, will do all the good that may be expected from treatment. Most surgical instrument makers



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now make plates which are fitted to the foot and worn inside the shoe. The foot, when well supported by such a plate, will often within a few weeks, as the arch grows higher, again grow painful, a sign that the plate is to be changed for another that will raise the arch still higher. This, when combined with massage, will often result in a very considerable amelioration of all the symptoms. In very bad cases the plate will have to be combined with an outside upright of steel so devised as to help invert the foot.

*Fractures of the Phalanges and Metatarsal Bones.*—Fractures of these bones are somewhat rare, and, owing to the fact that most of these are due to the fall of heavy bodies upon the foot, a comparatively large proportion are of the compound variety. About one-third of the fractures of the toes observed by the writer have been compound ones. The big toe is by far the most commonly fractured, and most frequently at the first phalanx. When the terminal phalanx is fractured the injury is nearly always compound, while in those cases in which the fracture does not communicate with the external air, there is practically always a severe contused or lacerated wound.

*Treatment.*—In compound fractures the most careful asepsis should be aimed at; any fragments of bone are to be removed, and the whole lower part of the foot should be placed in a wet dressing, kept wet by means of rubber protective. In simple fractures the toe may be immobilized in a silicate of soda or starch dressing. In some instances wrapping the toe in a couple of thicknesses of adhesive plaster will suffice.

Fractures of the metatarsal bones are seen with

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about the same degree of frequency as fractures of the toes. They are often compound, or, at least, combined with bruised and contused wounds. Little can be done to secure approximation of the broken ends, nor is it in most instances necessary to secure this. The neighboring bones act as splints. In compound fractures wet dressings should be used. In simple fractures rest and the application of a starched bandage will suffice. The results, however much swelling and deformity may occur at first, are commonly very good. If the bones should appear to be very badly misplaced, the surgeon may with advantage endeavor to restore them to their natural position under general anæsthesia.

*Amputation of the Toes and Metatarsal Bones.*—As in amputations of the fingers, the surgeon should not adhere to any hard and fast rule, but should amputate in any manner that will afford the most useful result, provided he does not infringe upon certain principles, which briefly enumerated, are as follows: Never make a flap so that it will result in a scar upon the plantar surface, and never make a partial amputation, excepting in the case of the big toe, as stumps of the lesser toes are of no possible use, and often give trouble on account of their tendency to stick upwards. In amputating the toes at the metatarso-phalangeal joint, Erichsen stated that the articulations are about the same distance above the web as the points of the toes are below it. This estimate is unquestionably excessive as the writer has often proved to his satisfaction, both on the cadaver and in surgical practice, and it will be found that a measurement of one inch above the web will very accurately locate the joint.

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In amputation of the smaller toes it is never advisable, if it can be helped, to remove the head of the metatarsal bone, as such a removal distinctly lessens the supporting power of the foot. The scar should be an antero-posterior one, the incision always beginning on the dorsal surface in such a manner that the adjacent toes will protect it. In the case of the little toe, an external lateral flap may be made, so as to result in a scar lying next to the fourth toe.



FIG. 51. Lines of incision in amputations of the toes.

If the great toe is amputated at the interphalangeal joint, the operation should be done with a plantar flap if possible.

Amputation of the great toe at the metatarsophalangeal joint is best done by the oval method.

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The head of the metatarsal bone must always be spared, if possible, as its loss very seriously interferes with the function of the foot. It is necessary in this amputation to remember the following important points: The flaps are to be made of a sufficient length, and this is greater than would be supposed, owing to the large size of the head of the metatarsal bone of the great toe. The incision by the oval method must begin rather more than an inch above the joint, and it should practically reach the phalanx before the lateral incisions are made. There is no objection to making the inner flap longer than the external one, *i. e.*, the one nearest the other toes. It is best to make no attempt to dissect away the sesamoid bones, as this would be likely to endanger the vitality of the flap by lessening its vascularity.



FIG. 52. Amputation of the great toe at the metatarso-phalangeal joint.

Amputation of the great toe is an operation that should never be lightly undertaken, for the reason that the interference with the function of the foot is very great. Patients who have lost a big toe are compelled to walk very flat-footed, and the normal gait is considerably impaired. The writer has on a



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number of occasions been consulted by people who had lost one or both big toes, usually as a consequence of frost bite, and has devised an apparatus which has in several instances improved the gait to a considerable extent. An ordinary shoe-sole, somewhat thick, is grooved upon the inner side for the reception of a flat steel spring about an inch wide, and

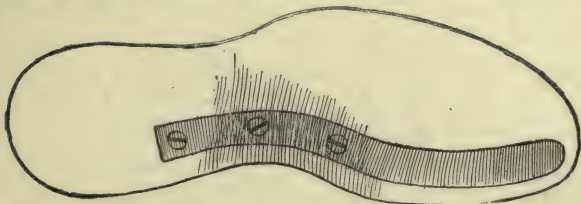


FIG. 53. Apparatus for cases in which the big toe has been lost.

as long as three-quarters of the length of the sole. The spring is screwed firmly upon the sole at two or three points upon its posterior end, and should be made of such thickness as to bend readily under the patient's weight. The end, as it bends, replaces to a considerable extent, the missing great toe.

*Resection of Phalangeal and Metatarso-Phalangeal Joints.*—Resections of these joints are but seldom done. In Polaillon's operation, described under the treatment of hammer-toe, in some irreducible old dislocations of the great toe, and in suppurating tubercular arthritis, these resections are occasionally performed. In comminuted fractures resections are also sometimes necessary. They are all performed through a longitudinal incision over the joint to be removed, upon the dorsal surface.

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*Injuries and Contusions.*—Blows of great severity may be inflicted on the chest with comparatively slight injury, owing to the elasticity of its walls. Ecchymoses frequently occur, and, while leading to the suspicion that costal or sternal fracture may be present, are often, together with a certain amount of cutaneous and muscular bruising, the only lesion present. Sloughing of the skin is rare. Abscess, as a result of contusion, practically never occurs, excepting where an injury to the bones has resulted, and, in these cases, the latter is usually of remote date.

In severe contusions, the question uppermost in the mind of the surgeon is whether or not a fracture has been sustained. In contusion the pain may be severe, and is commonly made worse by motion and pressure, yet the patient is able to cough, and pressure, while eliciting great pain, is not of the same character as in fracture. When the latter exists, the patient refuses to cough, as a rule, and pressure gives pain so sharp that there is a characteristic sudden shrinking, with evidence of intense pain. These signs are so marked that an experienced surgeon hardly needs to look for the physical signs of fracture itself, and can diagnose its presence from the symptoms just described. In contusion the pain gradually disappears, and more rapidly than in fracture. Patients who have suffered severe contu-

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sions, as well as those who have had one or more broken ribs, usually lie in a characteristic posture, upon the back, leaning over to the injured side just enough to give freedom to the sound side, and to slightly immobilize the injured part, without actually carrying direct pressure upon the seat of injury. The principle of treatment is practically the same as in fracture of the ribs. Immobilization of the injured side, with rest, is all that is necessary in the severe cases. Slight contusions practically require no treatment. The principles upon which the application of dressings to injured chests is based will be described when we consider the subject of fracture.

*Fractures of the Ribs.*—Owing to their elasticity, the ribs are far more frequently broken in the old than in young people. This may occur by direct violence, or by indirect force, when the chest is compressed in one place and the ribs give way at another, or, although rarely, by muscular effort. The most common situation is upon the convexity of the rib anteriorly to the angle. The first and second ribs are seldom broken, owing to their being protected by the clavicle.

We have already spoken of some of the symptoms of fracture, when treating of contusion. Crepitus may commonly, but not invariably, be elicited, and it may be exceedingly difficult to obtain when the fracture is behind the thick muscles of the back in strong men. Apply the hands upon either side of the suspected fracture, taking care that the same rib is dealt with by each hand, and press down alternately upon each side.

Uncomplicated cases commonly give an excellent prognosis. Union usually takes place rapidly, with the formation of a moderate amount of provisional callus.

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### *Treatment of Uncomplicated Fracture of the Ribs.*

—All surgeons are not entirely agreed upon the best manner of treating broken ribs. Rest and a certain degree of immobilization, however, form the basis of all treatment. If nothing else is at hand a broad bandage may be tightly placed around the chest, and must be prevented from slipping down by a couple of straps over the shoulders. Adhesive plaster, how-

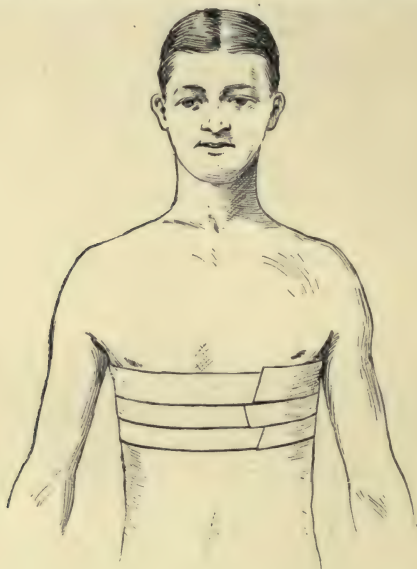


FIG. 54. Adhesive plaster surrounding the chest.

ever, is by far the best material to use, and may be employed in one of three ways: (1) The plaster may be placed entirely around the chest. This limits the breathing a good deal, yet the discomfort produced by this is really quite temporary, while the relief from pain is usually very considerable. The best way of applying it is to fasten the plaster to the



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sound side of the chest, pull it tightly over the back, then over the site of fracture, then across the chest and over the first end. Unless the bandage distinctly limits the breathing it cannot do any real good. (2) The second way is to place the adhesive plaster merely over the affected side, extending from the

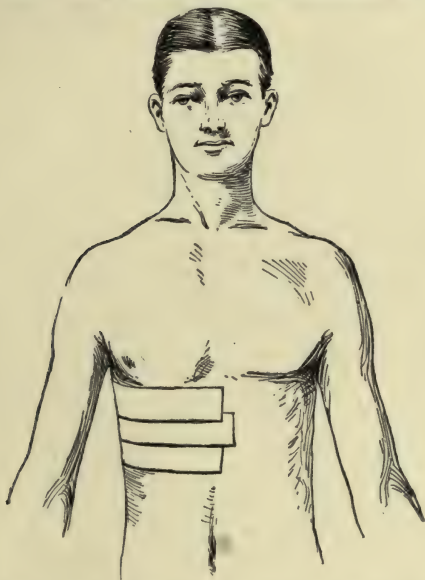


FIG. 55. Adhesive plaster half way around the chest.

spine to the sternum. The surgeon must be careful to apply the strips at the end of the expiratory period, otherwise the limitation of motion will amount to practically nothing, and the effect of the plaster will only be to make the patient think something has been done for him. Generally speaking, and notwithstanding many contrary opinions, the writer believes that the first of these methods is by far the better of the two. (3) The third way is one that is

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not very generally known or employed. It combines two good features, i. e., immobilization of the injured side with freedom of the unaffected side. The writer owes his knowledge of it to Dr. J. E. Kelly of this city, and has made exclusive use of it in the last few years. It is applied by placing the plaster high up on the chest of the unaffected side, pulling it diagonally down over the injured side, and fastening the end over the lumbar and anterior abdominal re-

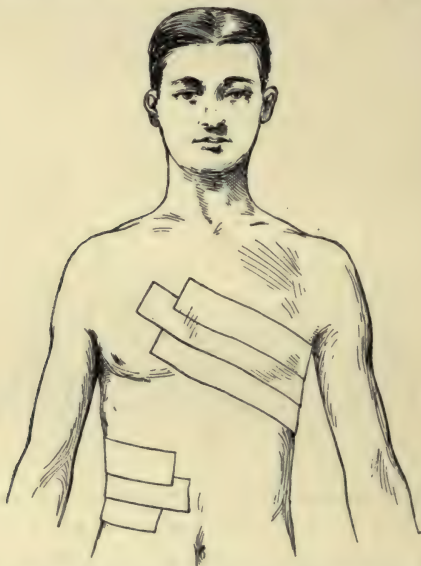


FIG. 56. Adhesive plaster diagonally around the chest.

gion of the sound side. The writer believes that it affords greater relief and less inconvenience than the first method, while it is far more effective than the second.

*Complicated Fractures.* — The complications of costal fracture may be emphysema, pneumothorax,

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hemothorax, hemothysis, wounds of the heart, the pericardium or the great vessels, wounds of the intercostal vessels, and wounds of the diaphragm and abdominal viscera. Of the latter the liver and spleen are most frequently injured.

Emphysema usually needs nothing more than pressure. In rare cases there may be decomposition and the production of gas in the tissues. This would require incisions and antiseptic treatment. If, however, there is no fever, a pad placed over the wound will prevent the further ingress of air, while that which has already made its way within the tissues will be rapidly absorbed. Pneumothorax and hemothorax may be followed by pleurisy, pneumonia, and later by empyema. All these must be treated according to the symptoms seen in each case. Visceral wounds are usually of grave import, and their treatment is outside of the scope of minor surgery.

*Incised Wounds.*—Incised wounds of the chest, when they do not penetrate the thoracic cavity, are usually of slight importance. The mammary vessels are the only ones that are apt to give rise to rather serious bleeding, and even with these strong pressure is commonly sufficient to check the bleeding in a short time. The general principles of aseptic surgery govern the treatment of all incised or lacerated wounds of this region.

*Burns.*—Burns of the chest, especially when situated over the cardiac area, are often of much greater importance than their extent would imply in other regions. They are peculiarly apt to be followed by inflammation of the pleura, lungs or pericardium, and commonly produce from the first a very severe degree of shock. In these cases the surgeon must look for shock, remembering that the

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pain may be comparatively slight, and that, to a superficial observer, the condition of the patient may seem much less threatening than it really is. In shock there is lessened pain, as a rule, with rapid small heart's action, and the patient seldom realizes the gravity of his condition. It is always far more marked in children than in adults. The primary shock may last a very long time, nor does its subsidence always mark a period of improvement, for, as the shock disappears, congestion of the underlying viscera is very apt to begin, and to rapidly increase until a very severe, and often fatal, degree of inflammation has become established. The underlying viscera are by no means the only ones that suffer, for meningitis with serous effusion, or thrombosis, or cerebral or sub-arachnoid hemorrhages, may further complicate matters. Albuminuria and nephritis may also supervene.

Burns of the abdominal walls share in all these dangers and complications, and the treatment indicated is that adopted for burns of both regions.

*Treatment.*—It is most important to cut away the clothes as carefully as possible, so as to inflict no needless injury or pain, and to prevent as soon as possible all access of air to the parts. If no aseptic dressings are at hand, household materials must be used. The whole burnt surface may be thickly powdered with flour, or coated with olive oil, and then covered with a dressing of cotton batting or, preferably, with absorbent cotton. The prevention of shock consists in the application of heat, in the form of hot bottles, or flatirons, and the head must be kept low. Hypodermics of strychnine, or nitroglycerin, whiskey or ether may be needed. It is best not to change the dressing until all symptoms



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of shock have disappeared. This may take twenty-four hours. If the wounds are very extensive, it will often be necessary to give an anæsthetic when making the first dressing, both to save pain and to prevent nervous shock. Have the dressings all ready before the wound is dressed, as it is important to save time.

Perhaps the most soothing application is that of a saturated solution of washing soda, which should be sterilized by boiling. Carron oil (equal parts of olive oil and lime water) is also useful. The picric acid solution (picric acid gr. lxxv, alcohol  $\frac{3}{4}$  ii, water Oii) is also an excellent application before granulations begin. An ointment of boracic acid in vaseline or lanoline is also useful. In a few days, as portions of the skin and underlying tissues begin to slough away, they may be washed off with peroxide of hydrogen, one to three or four parts of water, or with saline solution. Iodoform, or any of the other iodine preparations, may only be used when the burnt area is small, or severe poisoning might result. The ichthyol ointment, five or ten per cent., is very useful when there is much sepsis. After severe burns of the thorax and abdomen, the denuded area is often too large for skin grafting, yet the employment of a few small grafts is indicated for the purpose of making small epithelial islands whence further growth may start.

*The Treatment of Pleuritic Effusions* depends, to a very large extent, upon the nature of the contents of the pleural sac.

*Hydrothorax.*—The presence of serum within the pleural cavity may occur as a result of wounds which penetrate it, whether inflicted by a sharp instrument or by the ragged edge of a broken rib. In the latter

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case the pleura may be thus injured without any penetrating injury of the cutaneous and muscular surfaces of the chest. Pleurisy with effusion also arises in consequence of inflammatory processes unconnected with traumatism. The pathological researches of the last few years tend to convince us that non-traumatic pleurisy with effusion is, in perhaps a majority of instances, of a tubercular nature. Knowing, as we do, the comparatively benign nature of tubercular processes when confined to a serous cavity, the fact that so many cases go on to a more or less perfect recovery need not militate against this view.

*Treatment.*—That a pleuritic effusion of small extent is often absorbed in the course of a short time is an unquestionable fact. Hence, in a patient whose effusion is quite limited, and the level of which does not rise, it is perfectly justifiable to wait for some time. Under the influence of diuretics, diaphoretics and cathartics, a certain number of cases will get well spontaneously. If, however, the effusion is considerable in extent, showing no tendency to rapid absorption, it is a mistake to wait, and the effusion should at once be evacuated.

The writer desires to insist upon the fact that emptying the pleural cavity is an operation that brooks no delay. If done at all, as it must be in most cases, safety lies in early interference. If the chest is allowed to completely fill with fluid, thrombosis of the veins is likely to occur. Cardiac syncope is also far more apt to follow tapping when the lung has been compressed for a long time.

*Aspiration of Hydrothorax.*—Boil all the instruments to be used, and then place them in an antiseptic solution. Scrub the chest and axilla with soap

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and water, then with a carbolic acid solution. Spray the spot where the puncture is to be made with chloride of ethyl, or inject three or four drops of cocaine solution, not stronger than one per cent.

The point to be selected is either in the eighth intercostal space close to the angle of the scapula, or else in the axillary line, in the sixth intercostal space just in front of the edge of the latissimus dorsi. In some cases the operator can choose any point where bulging is prominent, as may occur in late cases, and where the dullness is marked. It is well to place

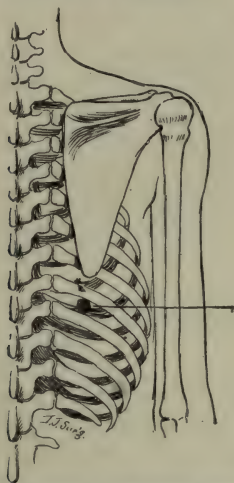


FIG. 57. Site of puncture in 8th space behind. (This space should have been represented as nearer to the angle of the scapula.)

the free end of the tube at the point of exit of the fluid in a vessel containing an aseptic and non-irritating solution, so as to provide for the possibility of an error by which the suction might take place in the wrong direction. If the needle should be blocked up by fibrin, it may be cleared by a stylet, or the

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suction may, for a few seconds, be so reversed that a flow of aseptic fluid occurs from without into the pleural cavity.

Washing out the cavity, through the needle of the aspirator, either with bland solutions, or with those containing iodine or other antiseptics is to be strongly condemned. This practice is responsible for most of the fatal results of this operation.

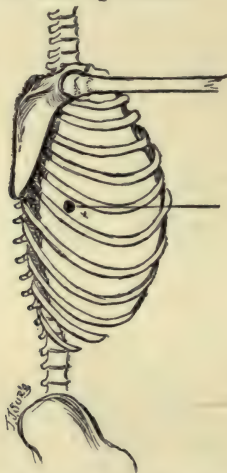


FIG. 58. Site of puncture in axillary line.

The needle is to be withdrawn as soon as a troublesome cough begins to occur. If the effusion is very large, not more than one-half is to be evacuated. At the slightest sign of fainting remove the needle and cause the patient to lie down. As soon as the needle is removed seal the opening with collodion, and keep the patient very quiet.

Strong evidence that the effusion may be of tubercular origin may be good cause for non-interference, as the collapse of the affected lung tends to hinder the development of a bacillary infection.



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The presence of bloody fluid in the pleura, excepting in cases of hydrothorax following penetrating wounds, points to the probability of tuberculosis or of cancer. In any case a distinctly bloody fluid would indicate the propriety of non-interference with the effusion.

*Empyema.*—The presence of pus within the pleura calls for removal of the effusion. In some cases, and rather most frequently among children, in whom the disease has existed for a long time, the pus may point to the surface and make its exit spontaneously. This most often happens about the third intercostal space not far from the sternum, but the writer has observed this occurrence nearly on a level with the diaphragm.

In empyema the use of the aspirating needle is to be condemned. If the fluid is to be evacuated, nothing but a free opening into the pleura is to be considered. The writer prefers to open in the seventh space, anterior to the border of the latissimus dorsi. Make an incision at least two inches long, and open the bulging pleura freely. Washing out the pleura at once is not recommended. It is at least useless, and may cause syncope or shock. If the pus is fetid and sanious, washing out may be done the day after, but, generally speaking, the writer is in accord with those who believe that little good may be accomplished by anything more than free drainage. The latter is to be maintained by the use of a good sized rubber drainage tube, transfixed by a large safety pin at its point of emergence from the chest, so that the tube may not slip into the cavity. A short silver or glass tube, with a wide flange, may often be conveniently worn.

The procedure just described is often sufficient in

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the case of children and in early adolescence. In adults, however, resection of a rib is nearly always advisable, as securing better drainage. This operation is done by incising the skin and muscles, parallel to and directly over the rib, for a space of about three inches. The periosteum is incised and pushed away with a periosteal elevator, and about two inches or more of the bone are removed with bone forceps.

Thoracoplasty, or Estländer's operation, consists in the removal of sections of a number of the ribs, with the object of permanently narrowing the chest. It is done in case the foregoing operations have failed in their object, for the cure of permanent fistulæ, for new sacculated empyemas, or when there is evidence

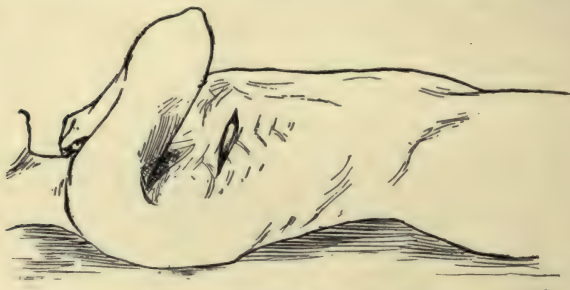


FIG. 59. Incision for resection of rib.

that the lung has become distinctly tubercular, or because the empyema is having a very bad effect upon the general health. For further considerations upon this procedure the reader is referred to works on major surgery.

*The Surgical Affections of the Thorax*, omitting mammary growths and diseases, which will be considered later, consist chiefly in a variety of neoplastic changes.

## THE CHEST.

The tumors most frequently observed in the soft parts are lipomata or fatty tumors. These chiefly occur upon the back, usually between the scapulæ. The skin is generally not involved. Removal of the tumor is the only treatment available. Lipomata may occur as retro-mammary tumors. In this position, while they might simulate a malignant growth, they can be distinguished from the latter because of their slow progress, their comparative painlessness, the absence of cachexia and their usual non-interference with the general health, unless, as has happened in some cases, they should, when of large size, produce cardiac disturbances.

Fibroma may be hard and of slow growth, being also less movable than lipoma, or else it occurs under the usually congenital form known as fibroma moluscum.

Chondroma arises from the sternum, ribs or cartilages, grows slowly, is painless and quite hard, and is generally seen in adults. It should be watched with a certain degree of suspicion, as it is often associated with sarcoma.

Osteoma may occur from any of the bones, is as hard as the bone itself, grows slowly and is usually painless.

Sarcoma may grow from any part of the chest, but is most frequently seen as a consequence of a similar growth occurring within the chest which makes its way outward through the walls.

Gummata occur as hard swellings. Trophic disturbances of the skin over them causes them in time to assume a purplish, congested hue, and ulceration may follow. This is most frequently the case with gummata arising from the sternum. The surgeon usually sees these cases after ulceration has already

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taken place. Anti-syphilitic treatment, with curetting and dressing with bichloride of mercury dressings or iodoform, will usually bring about a cure.

Tubercular or cold abscesses may arise from any part of the chest wall, most usually over the clavicles, sternum and ribs. The contents may undergo calcification. The treatment consists in a free incision, with every attention to asepsis. The contents are thoroughly washed out and the walls should be thoroughly swabbed with pure carbolic acid followed in three minutes by 95 per cent. alcohol. The importance of thus dealing with these tubercular abscesses is made plain by the fact that, when neglected, general tuberculosis may occur.

Tubercular ulcers should be treated by thorough curetting, the application of carbolic acid and alcohol, as above, and an iodoform dressing.

Carcinoma and sarcoma may occur at any point of the chest wall, and call for the earliest possible removal.



## THE BREASTS.

### THE BREASTS.

In girls before puberty, in men and in children, the breasts having no physiological activity are not frequently affected by any other ailments than those that are to be met upon or under any part of the skin. In women, and particularly in those in whom child-bearing and lactation have taken place, diseases of the breasts are exceedingly frequent.

The onset of puberty brings with it a beginning development of the mammary gland in young girls, which is often attended by neuralgic pains of all degrees of severity. These, in nervous patients, are sometimes the cause of much alarm. They require no other treatment than the application of a little belladonna ointment. The assurance on the part of the medical attendant that the trouble is of little importance and will soon disappear is probably of greater importance than any of the soothing applications that may be made.

In infants, shortly after birth, and, in the writer's experience, as frequently in males as in females, swellings sometimes occur in one or both breasts. These at first feel like small, somewhat rounded tumors, usually situated beneath or near the nipple. They commonly disappear within a few days, but once in a while we see a case in which the nipple allows of the exudation of a little milky looking fluid, or in which the case goes on to suppuration. Hence if the symptoms of inflammation are distinct, and there is

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the slightest fluctuation, it is necessary to incise in a line radiating from the nipple to the periphery. In other cases there is but a slight degree of inflammation that will soon subside spontaneously, or under the application of ichthyol ointment.

*Hypertrophy.*—We occasionally see cases of undue enlargement of the breasts, in which an increase of fibrous tissue has occurred. These cases occasionally reach such a hypertrophic state that the patient's comfort is much enhanced by their removal. These instances, however, are rare; they have been observed most frequently in rather young women, from fourteen to thirty years old. Iodide of potash has chiefly been relied upon in the treatment of this condition, but its value would seem rather doubtful.

*The Nipples.*—These are seldom affected until lactation begins, and are then subject to trouble from one of two chief causes, *i. e.*, sepsis and insufficient development. A sunken or malformed nipple, which the child cannot readily seize, is subjected, during the baby's efforts at suckling, to much irritation, while the milk is retained within the breast, whence occurs a constant engorgement of the parts. The treatment here is prophylactic. The nipples should early be examined in any woman that is pregnant, and if found undeveloped or sunken, gentle traction, pushing back the areolar area, and daily washing, will help to bring about protrusion and harden the nipple. It is to be understood that traction is only permissible in those cases in which the child would be most unlikely to be able to nurse, as there is danger of causing injury and consequent sepsis. In most instances the nipples will adapt themselves, soon after the birth of the child, to the demands of lactation. Tannin, alum and strong alcohol, as applications,

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should not be used, as they may cause exfoliation of the epithelial layers.

Lack of cleanliness brings about a tendency to sepsis or, at least, to irritation followed by eczema or erythema, fissures, and erosions, which are constantly made worse both by the child's nursing and by the constant erection of the irritated nipple.

The form of nipple lesion known as Paget's disease, in which the nipple is gradually destroyed by an eczematoid condition finally resulting in carcinoma, is a malignant papillary dermatitis, having little in common with true eczema.

Simple eczema or erythema may be treated by Lassar's paste. This, or any other greasy substance applied to the nipples during lactation, should always be made with a lanolin basis, as this permits a more thorough washing away before each nursing.

Fissures are best treated by painting with a strong solution of silver nitrate, and by giving constant attention to cleanliness. Erosions are treated in the same manner.

Abscess of the nipple sometimes occurs, though rarely. It is probably always situated in one of the lacteal ducts. It seldom contains more than a few drops of pus, though the distention may be great, and the pus can be pressed out in some instances and is followed by the flow of milk.

Chancre of the nipple is most common in wet-nurses, who acquire it from syphilitic infants with mucous patches, but the writer has seen several instances in prostitutes. The induration occurs slowly, gradually becoming very marked, and sometimes involving the whole areolar area. If the woman is not nursing, a scab commonly forms, but in wet-nurses this does not occur, as the child's suckling prevents

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its establishment. It is often difficult, at first, to distinguish this lesion from an ordinary fissure or erosion. The most suspicious circumstance at first is the relative painlessness of the sore. Bubo often occurs, either just under the edge of the pectoralis major, just anterior to the axillary line, or in the axillary region. As the secondary symptoms develop a large mucous patch is commonly formed. The treatment, of course, is that of syphilis. The painlessness of chancre is often so marked that the writer has been consulted by a nursing woman for a glandular swelling of the axilla which led him to examine

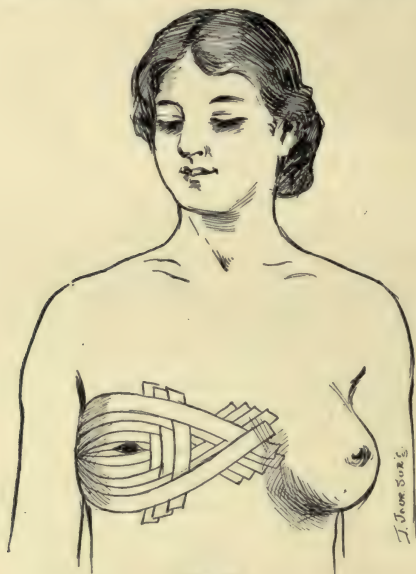


FIG. 60.

the nipple and discover a chancre of whose existence the patient was unaware.

Hyperæsthesia and neuralgia of the nipples are most apt to occur in hysterical or neurasthenic young



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women, and are to be treated chiefly by attention to the general health and habits.

*Mastitis*.—Inflammation may be acute or chronic. We have seen that it may occur in infants within a short time after birth. It also takes place, though rarely, in girls and women who have never borne children. The immense majority of cases occur, however, in primiparæ. In multiparæ the proportion of cases diminishes a great deal. Acute mastitis arises by infection through a milk duct or



FIG. 61.

through lymphatics exposed by some lesion. Most frequently one or two of the main lobes are involved, and the area affected usually appears greater than it really is through congestion of the rest of the organ.

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In other instances a number of lobes, or even the whole gland, may be the seat of an active inflammation. Retention of milk may give all the symptoms of early inflammation, by causing congestion and distention. In acute mastitis the case terminates either by resolution or suppuration. While the writer believes that, in ordinary cases, efforts to promote resolution are often successful, and should always be tried, he is also convinced that unless these are very rapidly successful, early incision should be resorted to. Neglect of this causes burrowing and extensive destruction, besides a continuance of pain which the patient should have been spared.

To promote resolution cold, by means of compresses or ice-bags, is of some value, but firm compression by means of bandages is preferable. The writer has obtained good results from the application of a thick layer of ichthyol ointment, covered with a piece of oil silk or thin rubber protective, in which an opening is made for the nipple to pass through. Then a thick smooth layer of absorbent cotton is placed over the protective, and the whole breast is firmly bandaged by one of the methods shown in the illustrations. If, as a rule, the patient is a nursing woman, it is best to allow the child to suckle from the other breast only. Massage is not usually beneficial if a true mastitis is taking place. If in forty-eight hours a decided amelioration has not taken place, entirely distinct from the temporary sense of lessened pain due to the application of a well fitting bandage, the chances will be that pus is forming. The slightest evidence of its presence is a sign for incision, which should be made freely, in a line radiating from the nipple to the periphery.

In cases that have been neglected, in which there

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may be several foci of purulent infection, each of these is to be incised. Septa between cavities may be broken through with the finger. If drainage is poor make a second incision in the most dependent portion of the abscess cavity and drain through. If there is any sloughing the sloughs are to be curetted away. Wash out the whole cavity with peroxide of hydrogen, and repeat this daily as long as perfect drainage exists, but no longer. As soon as healing commences use compression to obliterate the cavities.

In purulent mastitis the axillary glands, while often inflamed and tender, seldom suppurate.

Whenever, in neglected cases, many sinuses have formed, they must be enlarged and curetted, and swabbed with silver nitrate or chloride of zinc solutions (gr. xl- $\frac{3}{4}$  j). Unless so treated chronic fistulæ are apt to persist. These may be dissected out, but it is often sufficient to swab them with a probe upon the end of which some nitrate of silver has been fused, or to inject them with protargol or nitrate of silver solution, and bind the patient's arm closely to her side.

*Chronic Mastitis.*—In this condition there may be a low degree of chronic inflammation unattended by the formation of pus, or a tendency to a local formation of pus in small areas. As it often gives rise to the formation of hard nodules it may often be mistaken for malignant disease. This, however, is of no very great importance, since amputation is the only efficient way of dealing with chronic mastitis. The chief practical point is that if chronic suppuration exists, with no other signs pointing to cancer, a less extensive operation than in the latter case may suffice.

*Tubercular Mastitis.*—This is most frequently due to extension from tuberculous lesions in the neighborhood. When primary it may occur in the form of

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cold abscess, or as an infiltration with formation of hard masses and loose granulation tissue. Sinuses are apt to persist if abscesses are allowed to open spontaneously. When abscess occurs, it should be evacuated, washed out with peroxide and then packed with gauze impregnated with iodoform emulsion. In the nodular form removal of the affected tissues is indicated.

*Tumors of the Breast.*—These tumors are either benign or malignant, and it is of the utmost importance that the surgeon shall ever remember that, of the former, the greater number are capable of assuming a character of malignancy, or may be of such a nature that the border line is a most indistinct one. The differential diagnosis is, therefore, in many instances, a most difficult one to make; hence, in all cases, the unvarying rule must be that in case of doubt immediate operation should follow. If this course be followed in view of possible malignancy, the surgical procedure adopted must be absolutely thorough, as in Halstead's operation. It is not our province here to describe this or similar operations, since they belong to the domain of major surgery, but the writer desires to insist upon the fact that removal of the breast, as done at present, is an operation demanding a high degree of operative skill, and that in cancer partial procedures, involving merely the excision of the whole or of part of a breast, constitute malpractice. No operation for ascertained or suspected malignant disease is justifiable unless all the neighboring glandular structures are removed at the same time.

Every surgeon in large practice has seen scores of cases of recurrence of cancer of the breast after partial operations. These imperfect procedures result



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from two chief facts: in the first place the removal of the breast alone is so simple a matter that every one feels competent to do it, while only the practiced surgeon can properly clean out the adjacent glands. In the next place some practitioners have had a tendency to consider thorough operation unnecessary if they could feel no enlargement of the glands. This fatal mistake would disappear from the field of surgery if all could realize the fact that while enlargement of the glands is a nearly positive evidence of malignancy when felt in a case of non-septic tumor of the breast, the absence of any enlargement that may be felt does not in any manner prove that they are not involved. The writer, in the last five years, has operated upon twenty cases in which the glands could not be felt at all. Microscopical investigation showed that in sixteen of these cases the glands were actually involved, while in seven of these instances, occurring in stout women, the deeper glands, which could not be felt by digital examination made over the skin, were actually very materially enlarged. It is, therefore, evident that the surgeon who curtails his operation on the ground that the glands are not enlarged, is assuming an unjustifiable and harmful authority.

*Benign Tumors of the Breast.*—The writer believes that in the last few years the medical profession has fortunately become far more suspicious than it used to be of the character of all mammary tumors. Benign growths of the breast are, as a matter of fact, really rare as compared with malignant ones. Billroth, after examining 440 tumors of this region, found that only 18 per cent. were benign. Hence, more than four out of every five such tumors are malignant.

Benign tumors, however, do occur in a certain

## REGIONAL MINOR SURGERY.

number of cases, and, if the surgeon is certain of his diagnosis, the operative treatment is simple enough to be permitted a place in a work on minor surgery.

*Pure fibroma and adenoma* are practically never seen. A mixed tumor in which the elements of both these growths are found, forming a *fibro-adenoma*, is on the other hand fairly often met with. The growth is slow, limited to a rather distinct area, and quite hard to the touch. The tissues overlying it are freely movable, and the tumor itself may easily be moved. There is usually little or no pain, and the general health is only affected to any extent when the patient's fears disorder her nervous system.

*Cystic Tumors* are usually benign, although cystic sarcoma is by no means very uncommon. Benign cysts are due to obstruction of one of the milk ducts, or have an independent origin, when they are due to softening of the interior of a tumor, which may be a fibro-adenoma, a lipoma or an enchondroma. Malignant cyst results in the same way from sarcoma. **A**gain, hydatid cysts of the breast have been observed, though very rarely. Benign cysts commonly are of very slow growth, although in some instances the establishment of the menopause seems to hasten their formation a great deal. The tumor is smooth, not attached to the skin, as a rule, and fluctuation may be made out. Aspiration with a hypodermic needle will facilitate the diagnosis. In some instances, a long period of slow growth is followed by a rapid increase in the size of the tumor, as we have already stated, and this is due not to the great enlargement of the original cyst, but to the formation of new ones. It is often the case that the small, monolocular tumors are distinctly painful, while the larger, multilocular ones are seldom attended with pain, which

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only comes on, and then to a moderate extent only, when the tumor is so large as to distend the skin and even to break through it, forming papillomatous looking masses.

*Lipoma, enchondroma and angioma* of the breast are so seldom seen that many surgeons in active practice may never meet with a case.

*Myxoma and endothelioma* form a connecting link

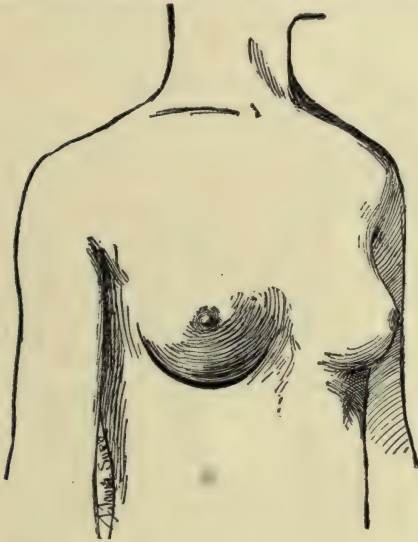


FIG. 62. Incision for small benign tumor.

between the benign and the malignant tumors, and are very apt to assume in time the characteristics of the latter.

*Treatment.*—In the presence of a tumor of the breast that is pretty distinctly circumscribed and freely movable within the breast itself; apparently lighter in weight than carcinoma; without the peculiar stony feel of the latter; in which there is no

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shrinking of any part of the breast or nipple; in which there is no pain, or else the pain is of a dull, continuous character, instead of the paroxysmal and lancinating pains of cancer; where the growth has been very slow and the superficial veins, instead of being prominent and large, are little involved, and in which the general health has been very little, or not at all impaired, the surgeon may feel fairly confident that he has to deal with a benign growth.

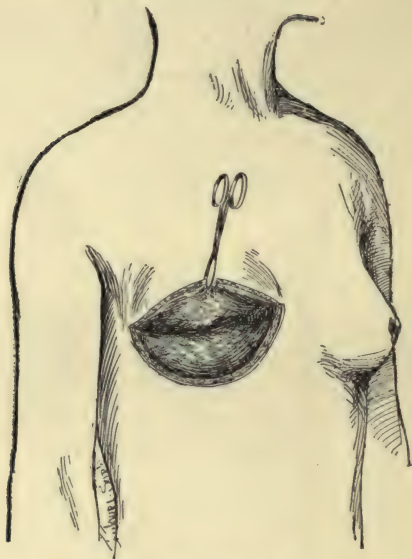


FIG. 63. The flap lifted up.

The treatment consists either in leaving the case severely alone, or in operation. The only exception to this rule would be in the presence of a slow growing, painless small tumor with a distinct history of antecedent syphilis, when the presence of a gumma might be suspected. In such a case *antisyphilitic*



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treatment might be tried, although it must be borne in mind that many benign and malignant tumors will show a temporary subsidence under the effects of the iodides and of mercury. Gumma of the breast itself is very rare, and unless the tumor steadily disappears the experiment must not be continued long.

The reason for leaving these tumors alone, if an operation is refused, is that no form of external med-

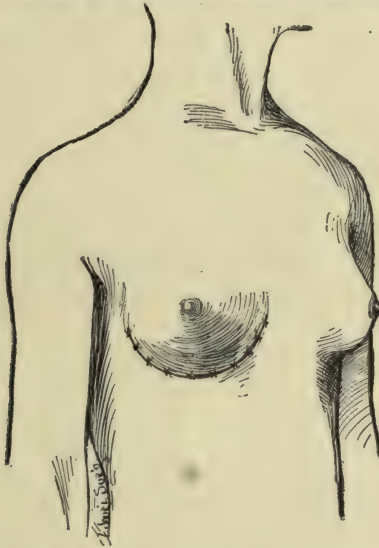


FIG. 64. Suture completing the operation.

ication can be of the slightest avail, and that any form of irritation might possibly help to bring about a character of malignancy.

The value of early operation is unquestionable. Every woman who is afflicted with a mammary tumor, of whatever nature, considers her life as being in jeopardy, and there enters into her existence an element of restlessness and fear which, however bravely

## REGIONAL MINOR SURGERY.

she may bear it, is none the less a most severe drain upon the nervous force. In every instance in which the writer has removed a benign tumor he has never failed to hear the patient thank him for having finally persuaded her to rid herself of this incubus. Not only, however, does the operation result in greater happiness to the patient; an early removal prevents increase in size of the tumor, precludes the possible change of a benign growth into a malignant one, and most important of all, permits of a microscopical examination which may at once and forever quiet the sufferer's fears. If, contrary to the surgeon's expectations, the tumor should chance to prove malignant, a thorough operation done at once offers the best chance of a complete extirpation of the neoplasm.

For these reasons the writer has always considered it his duty to strongly urge an immediate operation in every case of tumor of the breast that has ever come under his care.

*Operation.*—Removal of the entire breast by two semicircular incisions is required whenever the tumor is a very large one. In dealing with smaller tumors the operation shown in the annexed figures is preferable. An incision is carried half way around the breast, in the sulcus around the lowermost half. The bleeding vessels having been clamped, the flap is dissected upwards, together with a layer of fat, and the tumor exposed. The latter is then thoroughly removed, and the flap is returned to its former position and carefully stitched to the corresponding parts. If the tumor is of fair size the breast will then appear a good deal flatter than the other one. If small the difference in size may be hardly perceptible, a fact which in itself recommends early operation. The resulting scar will practically be invisible, being covered by the sagging of the breast.

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A simple incision on a line radiating from the nipple to the periphery will permit of the removal of small growths, and, in elderly women, the scar will not be objected to. Such an operation may rapidly be done by means of local anæsthesia.

For the treatment of malignant disease of the breast the reader is referred to works on general surgery.

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### THE GENITO-URINARY SYSTEM.

#### THE PENIS.

*The Prepuce.*—While it is not probable that any male can receive anything but benefit from the removal of his prepuce, the operation is often resorted to, especially in children, for insufficient immediate cause. However redundant the prepuce may be in a child, if it can be pulled back clear of the glans, and if it is not adherent to the latter, the indication for circumcision only lies upon the application of general principles. It is an unquestionable fact that circumcision is very often resorted to in cases of masturbation and of nocturnal incontinence of urine, in which the trouble is in no way improved by the operation. If, therefore, the practitioner deems it proper to circumcise for the relief of one of these conditions, it is best that he should guard against assuring that this in itself will bring about a cure. He should simply state that this will help to obtain a good result, and that the latter may not be observable for a long time.

If the prepuce merely adheres to the gland, the adhesions may be separated with the fingers or some blunt instrument. The glans and corona are then thickly dusted over with boracic acid or any other bland powder, in order to keep the surfaces apart, and the prepuce drawn back over the glans in order



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to avoid paraphimosis. The foreskin should be drawn back daily by the mother or nurse, for cleansing and further dusting.

*Circumcision.*—This operation is done in the child for redundant foreskin, for the disturbances already mentioned, and also on account of a narrow preputial orifice. Some small children have an opening in the prepuce that is so small that the latter balloons out with urine at each micturition, while an exceedingly narrow stream of urine is projected from the

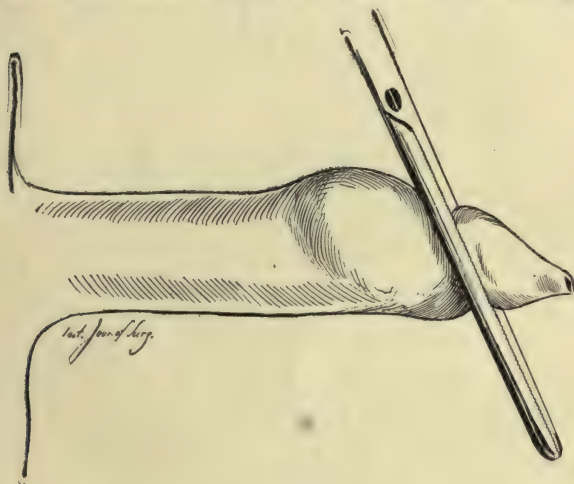


FIG. 65.—Position of the clamp in circumcision.

hole opening. If the parents object to circumcision a slight slit at the upper part of the prepuce may suffice, but in every case it is best to perform the complete operation.

In very young children the use of an anæsthetic is hardly necessary, unless the parents insist upon its use. The child may be firmly held and the opera-

## REGIONAL MINOR SURGERY.

tion can be done so rapidly that it is hardly worth while to expose the child to the slight risk of anæsthesia. In older boys the struggles are so great that complete anæsthesia is advisable. Cocaine is not recommended, because the children struggle far more on account of fear than because of the pain, and it is exceedingly difficult to keep them quiet even after local anæsthesia has been thoroughly established.

There are two most commonly adopted methods of performing this little operation. The first consists in the removal, by one stroke of the scissors or knife, of the redundant prepuce over a clamp. In the second method the blade of a pair of scissors is passed under the prepuce, which is slit down nearly to the corona, after which the remaining flaps are trimmed off. The first of these operations is always best in small children, owing to the greater rapidity with which it may be performed. The clamp must be placed diagonally, from above downwards, so that the lower end of the prepuce is left longer than the upper. In small children the operator must carefully guard against including a portion of the glans within the clamp. There is another danger which consists in removing too much of the prepuce. If this is cut too short it will increase the tension upon the stitches, and if the latter be torn out, the skin covering the penis may be retracted downwards to a considerable extent, necessitating skin grafting or a long period of delay until the organ is again covered with skin. The writer has seen at least two cases in which, owing to too liberal a removal of the prepuce, the skin was retracted all the way down to the pubis, and convalescence was protracted for a long time. After the prepuce has been snipped off, if the mucous surface adheres to the glans it is to be peeled away

## THE GENITO-URINARY SYSTEM.

from it. The cutaneous must then be joined to the mucous surface by means of stitches. Never use a continuous suture. Owing to the possibility of erections, and because it is impossible to use a perfectly aseptic dressing in this location, stitches may be torn out, an event of much less importance if there are a number of interrupted stitches than if there is a continuous one. The best suture materials are silk and horse hair. After the stitches are tied it is well to cover the line of union with thin shreds of absorbent cotton dipped in iodoform or aristol collodion. A thin gauze bandage is then placed around the upper part of the penis.

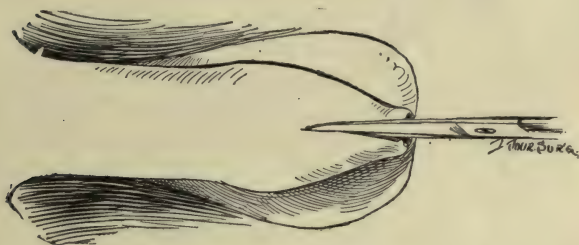


FIG. 66.—Slitting the prepuce.

In the second method no clamp is used; the upper part of the prepuce is slit up, and the flaps are removed by means of circular incision running from the upper angle down to the distal attachment of the frenum. The advantage of this method, in the hands of a surgeon who is possessed of an accurate eye, lies in the fact that the incision is more precisely done, and there is no bruising of the tissues by the clamp. After the bleeding has ceased the dressing already described is applied.

## REGIONAL MINOR SURGERY.

In adults the operation may, as in children, be done for congenital phimosis or for phimosis that is acquired, either through an existing inflammatory condition, or as a result of cicatricial contraction due to previous inflammation. If there is much inflammatory disturbance present, it will sometimes be best to delay a complete circumcision for some time. The prepuce may be simply slit up enough to expose the sores properly. The bleeding will often be rather advantageous than otherwise. The operation may be completed after the sores have healed. There is always a danger, in the presence of chancre, that the performance of complete circumcision may be followed by the formation of chancres along the line of union. The stitches are apt to tear out, permitting of retraction of the skin. In men the operation may easily be done with cocaine anesthesia. The penis is slightly constricted at its root with a rubber band, and a two per cent. solution of cocaine is injected beneath the skin all around the proposed line of incision.

*Paraphimosis.*—This is a condition in which the tightened foreskin is drawn over the glans and produces constriction. The latter may be so severe as to cause, in bad cases, the glans to slough away, unless promptly relieved.

In children it is most frequently caused by the boy's drawing back a tight prepuce over the glans and being unable to replace it. The little patient is commonly afraid to make his trouble known at once, and it is often only after the swelling has become considerable that he will complain. In adults whose foreskin habitually lies in the corona, swelling of the parts through inflammatory disorders is most frequently at fault. In those having a long prepuce, the latter



## THE GENITO-URINARY SYSTEM.

is drawn back in order to better attend to some sore, and the patient finds himself unable to replace it owing to the swelling that has taken place. It is most unusual that an adult having no inflammatory disorder is unable to replace his prepuce over the glans. The writer has observed one instance in which a newly married man had a tight prepuce forced back of the glans during coitus, resulting in a marked paraphimosis.

*Treatment.*—Never employ ice to diminish the swelling, as this may increase the tendency to sloughing, besides which the loss of time is of importance. First steady the penis between the fore and middle fingers of both hands, and gently and gradually compress the glans with the thumbs, after having covered the latter with oil or vaseline. A few minutes of gentle though firm kneading of the glans, while the fingers push the preputial roll forward, will in the majority of instances suffice to effect a reduction. Bandaging the glans itself with a strip of gauze for some minutes will in some cases diminish the congestion enough to render the reduction more easy. If these methods prove insufficient, the constricting ring is to be cut. A grooved director may be pushed under the ring, which is then nicked enough to afford room to bring down the prepuce. In the absence of a grooved director the doubled end of a hair pin may be used, or a blunt pointed knife may be slipped over the glans and under the prepuce. This little operation must be done with some care, as too free an incision might result in a complete slitting of the prepuce, which would then have to be removed at what would then probably be an inconvenient time. If, however, a circumcision is desired, the anterior aspect of the ring is cut entirely through,

## REGIONAL MINOR SURGERY.

and the operation ended as described in the second method of circumcision.

*Laceration of the Frenum.*—This little accident occasionally takes place as a consequence of rough or awkward attempts at coitus, and sometimes gives rise to very profuse bleeding, which, however, does not usually last long. Nothing but an antiseptic dressing is required, as a rule.

## THE URETHRA.

*Injuries.*—Foreign bodies are occasionally pushed into the urethra. This occurs most frequently in boys, and occasionally in adult men. In women foreign

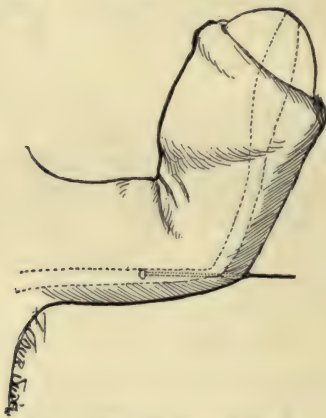


FIG. 67. Pushing out the point.

bodies, owing to the shortness of the urethra, seldom remain within this channel, as they find their way into the bladder. Blunt-headed pins, smooth elongated bodies such as pencils, etc., are the most common sources of trouble. Round bodies seldom remain in

## THE URETHRA.

the urethra, as the next discharge of urine commonly washes them out, and irregular bodies are hardly ever introduced since this act would be a painful one, but rough calculi or fragments may often be retained. Pins with large rounded ends are introduced head first, and, if they slip into the urethra, the point soon becomes engaged in some part of the wall. In order to remove them, if, as is usually the case, it is impossible to seize the point with forceps, the urethra should be grasped so that the operator's thumb lies firmly just back of the head of the pin. The other hand grasps the penis at the glans, elongates it as far as possible, and, bending it upward and backward, forces the point of the pin out through the floor of the urethra and the skin. It is then drawn out as

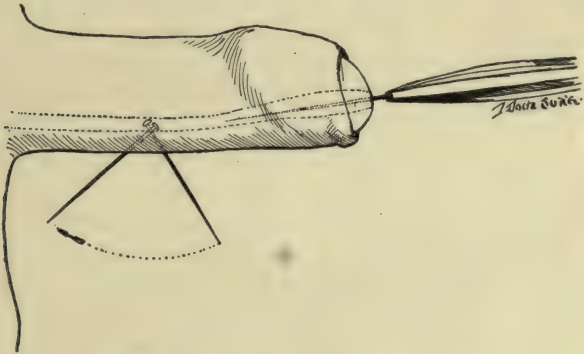


FIG. 68. Turning the pin head forward.

far as possible and turned in the opposite direction, so that the head may be pushed out of the urethra, or reached with a suitable forceps.

In the case of smooth, elongated bodies, if efforts at removal fail through the urethra, it is best to cut down upon the end of the body, through the floor of

## REGIONAL MINOR SURGERY.

the urethra, and to remove it through the incision, which is then carefully stitched up with fine silk.

*Wounds.*—The urethra is seldom wounded except as a complication of severe and extensive injuries. Punctures heal very readily as a rule. Incisions of the penile portion are rare, except as a result of surgical procedures. In the perineal portion they occur as a result of falling upon sharp instruments, and usually heal as readily as the wounds made by external urethrotomy, unless sepsis occurs. These wounds should be carefully sutured and the stitches must be removed in three or four days. If left longer they are apt to cause infiltration. A catheter must always be placed in position and retained there. If the wound is very ragged and the urethra is not completely severed, pass a catheter without stitching and allow the wound to heal by granulation. The writer entirely agrees with Guyon in the statement that the catheter should be of a much smaller calibre than the urethra. Many have recommended that the catheter should entirely fill the urethra in order to prevent the flow of urine along the side of the catheter, *this with the object of preventing infiltration.* As a matter of fact a tight catheter promotes it, for nothing can prevent a certain amount of urine making its way by the side of a catheter, however tight, and it is far better that the urine should flow freely over the surfaces than that it should be in any way retained.

Ruptures and lacerations are severe injuries requiring operative methods best studied in books on major surgery. The point of main importance in their treatment is the fact that, at the slightest sign of the occurrence of infiltration, the surgeon must at once cut down upon the seat of the injury so as to permit



## THE URETHRA.

thorough drainage to take place. If a catheter can be passed before extravasation has taken place, this may prove sufficient to prevent its occurrence. If the laceration is partial, it may be stitched after passing a catheter. If complete, the ends must be sought for and joined together, an operation that is frequently of great difficulty. The writer desires to impress the fact that the infiltration is the great danger. Hence, if the practitioner doubts his ability to search the wound for the severed ends and to bring them together, it is still his duty, unless more expert aid is readily obtainable, to incise for the sake of drainage as a preliminary measure, until the arrival of the consultant or the removal of the patient may permit of completing the operation. A delay of several hours may easily prove fatal.

*False Passages.*—These seldom give rise to much trouble if made with a comparatively small instrument and if not too extensive. When made by a large instrument they may give rise to symptoms of infiltration, which are to be treated by at once securing a free passage for the urine. This will commonly necessitate an external urethrotomy.

*The Penis.*—Incised wounds are to be treated on general principles. When the dorsal vessels are severed the bleeding may be very free for some time. Deep wounds of the body are apt to produce deformity on erection owing to the production of cicatricial tissue.

*Fracture.*—This may occur from blows received during erection. Extravasation occurs immediately and copiously. Incision is not to be adopted unless there is evidence of suppuration. The best method of treatment is probably that long ago recommended by VanBuren and Keyes, which consists in passing a

## REGIONAL MINOR SURGERY.

firm gum elastic catheter into the urethra, and wrapping the penis in adhesive plaster in order to obtain compression. Any dressing applied must be frequently inspected and changed, as the swelling subsides.

### THE SCROTUM.

Injuries are not common, yet we see a certain number of cases due to kicks and blows, in which there is more or less contusion. In bad cases rupture of veins allows the formation of considerable hæmatomata in the loose cellular tissues. The writer has seen several examples of such injuries in which the scrotum became about as large as a man's head. The ecchymosis may extend over the pubis and upon the abdomen. Blood may be effused within the tunica vaginalis, forming a hæmatocele. The latter condition may coexist with hæmatoma of the scrotum. In all these cases the scrotum is to be carefully disinfected, especially if any abrasion of the skin exist, and then treated by rest, cold and compression. If the skin is unaffected, a cooling lotion of ammon. muriat., 3 ii, alcohol and water, aa ʒ ii, will give comfort. Incisions are never to be resorted to unless there is evidence of suppuration.

*Incised and Punctured Wounds.*—Incised wounds demand the most careful cleansing and stitching. If the tunica has been penetrated it must be washed off with copious amounts of warm saline solution. If there is any probability that sepsis may supervene, a drainage of horsehair or silkworm gut must be placed in position.

Sloughing of the scrotum takes place very readily,

## THE SCROTUM AND TESTES.

but, however extensively the covering has been lost, there is always a strong probability that another will replace it in good time. The writer has had particularly good results in applying skin grafts in this region.

The neoplasms of the scrotum offer nothing of peculiar interest. Epithelioma, once a common disease in chimney-sweeps, is now exceedingly rare.

## THE TESTES

*Undescended testicle* is fairly common. Its operative treatment is, generally speaking, quite unsatisfactory. If its exposed position in the inguinal region gives rise to trouble, removal is by far the best procedure as they are somewhat apt to develop a tendency to malignancy.

*Epididymitis*.—Inflammation of the epididymis occurs alone or in association with a similar condition of the testicle. The latter is so much the more frequent that the term epididymo-orchitis is probably most generally suitable to the condition existing. In gonorrhœa the epididymis alone seems fairly often affected. Traumatism and infections due to sepsis commonly affect both the epididymis and the testicle. The treatment of this condition is similar to that of orchitis.

*Orchitis*.—Inflammation of the testicle may be due to injury, to septic infection from gonorrhœa and general infections causing septicemia, and to some of the infectious diseases such as mumps, typhoid and malarial fevers, and gout. Tubercular testis results from the effects of the tubercular bacilli, but is not

## REGIONAL MINOR SURGERY.

attended by the general symptoms of inflammation. Syphilitic disease causes a chronic enlargement, usually painless and of slow growth.

*Treatment.*—In the treatment of ordinary orchitis due to septic infection, rest and quiet are of the greatest importance. Cold is seldom well borne for a long time, and warm applications are preferable. Painting the scrotum with guaiacol dissolved in three parts of some bland oil is of service. Ichthyol also is of some advantage in some cases. The old fashioned tobacco poultice is filthy and of questionable value. If there is any fever the use of aconite or veratrum viride is of use if early employed.

As the testicle diminishes in size, after the subsidence of the acute inflammation, strapping is of great value if properly done. It must give support and a fair degree of compression. Simply placing straps on the outside of the scrotum does no good at all. The strips of adhesive plaster must absolutely isolate and compress the diseased organ.

*Hydrocele.*—The serous sac surrounding the testis may become inflamed in consequence of testicular sepsis, resulting in acute hydrocele, in which the fluid is commonly in small amounts. Suppuration has been known to take place, but is rare. In chronic hydrocele the sac may become greatly distended.

*Treatment.*—The treatment of chronic hydrocele consists in aspiration with or without the injection of some irritant fluid, or the introduction of some aseptic foreign substance, or in operations in which the tunica is removed, or in which it is incised as in Volkmann's operation.

Simple aspiration or evacuation by trocar and canula brings about a radical cure in but a very small percentage of cases. It is done by firmly holding the



## THE TESTES.

sac so as to render it tense, and the instrument, guarded by the index finger so as to prevent its penetration beyond the desired depth, is quickly introduced at the junction of the lower and middle third of the scrotum, in a direction slightly upward.

Iodine and carbolic acid have been used mostly in the injection treatment. The latter is less painful and as efficacious. From ten to twenty drops of carbolic acid, dissolved in a little glycerin, are drawn up into the barrel of a hypodermic syringe. The trocar is introduced, as above described, and the needle is then pushed in the sac at some distance from the trocar. The needle must be made to feel the point of the trocar, so as to be certain that the point lies in the sac and not outside of it. The trocar is then removed from the canula and the fluid is allowed to run out. The piston of the syringe is then slowly pushed and the acid allowed to escape in the sac, which must be kneaded so as to spread the carbolic over all the parts.

While all these methods have advantages, and are generally followed by no untoward results, still we occasionally see instances in which they cause a very severe degree of inflammation. Another form of treatment which has given the writer at least as good results as the injection method, and which is quite painless, consists in the introduction of eight or ten inches of medium sized sterilized catgut through the canula. This is pushed in while the serum is flowing. As soon as the latter is evacuated the canula is withdrawn, the protruding end of gut is cut level with the scrotum, and by a little manipulation through the walls of the latter the end of catgut is drawn well into the tunica.

The cutting operations are really the most satisfactory, if the operator is sure of his asepsis.

## REGIONAL MINOR SURGERY.

*Varicocele.*—In this condition the dilated veins of the cord form a tortuous mass that has been compared to a bunch of angle-worms. In old cases the testicle may atrophy to some extent, and is apt to be more pendulous than normal. Most patients only complain of a slight dragging sensation, and the affection derives most of its importance in the minds of the neurasthenic or of those who have been frightened by the assurances of quacks. Still, the feeling of weight is certainly uncomfortable, and there seems to be a tendency, in some cases, to some diminution of the sexual powers.

*Treatment.*—The use of a well-fitting suspensory bandage is often, with exercise and regular habits, enough to bring about a satisfactory improvement. In bad cases, or in those whose mental condition necessitates a radical cure, operation is advisable. Subcutaneous ligation is a little operation needing some skill, and removal of the veins through an open incision is preferable.

## THE BLADDER.

There is nothing that is much more appalling to a surgeon than to see the manner in which the male urethra is often roughly handled during attempts at passing instruments through a narrow canal. It is not possible always to prevent the occurrence of a certain amount of bleeding, but extensive lacerations and false passages are invariably the result of careless and unskillful work.

The two conditions causing retention, in which such poor surgery is commonly seen, consist in strict-

## THE BLADDER.

ures due to cicatricial contraction and in a narrowing due to an enlarged prostate.

In the presence of a stricture causing retention, a hot bath and a small amount of morphine or opium, in the form of a suppository, will often again allow the urine at least to dribble out. If this does not occur, the urine must be mechanically removed. If the retention has lasted some time, and if unwise efforts have already been made to pass an instrument, so that there is much laceration of the tissues, it will often be best to waste no time in further efforts, but to resort at once to suprapubic aspiration. The relief of the retention, with the sleep following the admin-

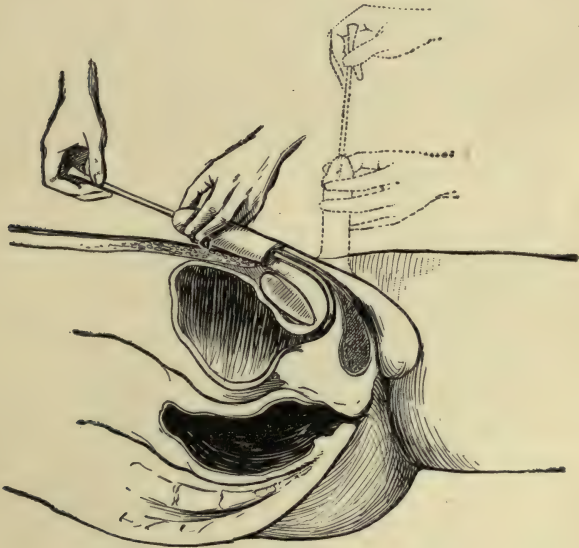


FIG. 69.

istration of opium, will often result in a much improved state of affairs the next day. The employment

## REGIONAL MINOR SURGERY.

of filiform bougies in tight strictures is the first means to be tried. They are passed one after another as far as they will penetrate, until the canal, as far as the stricture, is filled with them. Then each is separately gently twisted with slight pressure, until one is found to penetrate the opening. The others are then removed, and the tunnelled catheter is passed over the filiform, acting as a guide. If this cannot be done, leave the filiform in, draw the urine suprapubically, and allow the patient a few hours of rest. The urine will then often begin to dribble out along the side of the filiform. Even if this should not occur, however, the presence of the filiform for some hours will materially enlarge the canal, and a larger instrument will often pass in readily. If a catheter, however small its calibre, can thus be introduced, it must again be allowed to remain in position for about twelve hours, after which a still larger instrument will readily enter. Dilatation by means of steel instruments may, after the lapse of another day, be safely begun, unless the surgeon has decided to cut the stricture. Much practice in such matters invariably results in the opinion, on the part of the surgeon, that there are no impassable strictures, but only strictures that the surgeon is unable to pass. Experience and gentleness reduces the number of these to a very small proportion indeed.

Filling the canal with a syringe full of warmed and sterilized oil is invariably to be practiced before trying to use the filiform, and, in fact, before every attempt to pass a tight stricture with any instrument. It allows them to penetrate more readily, and, in case of injury to the walls, probably prevents any bad effects due to the possibility of urinary absorption.

Cases of retention due to prostatic enlargement may



## THE BLADDER.

require the same preliminary treatment, hot bath and opium with possibly suprapubic puncture. It is well to remember, however, that some of the old men who are subject to this accident do not bear opium very well.

In the majority of cases in which we are called upon to relieve retention occurring in prostatics, we find that the patients have for some time been in the habit of passing a catheter upon themselves, and that they have suddenly become unable to repeat this procedure successfully. This may follow excesses in eating or drinking, or else cold is incriminated, or the patient, for one reason or another, remained for a longer time than usual without emptying his bladder. If the patient has been in the habit of catheterizing himself, it is generally useless for the surgeon to try and use the instrument which the patient has been employing. He has probably reached a considerable

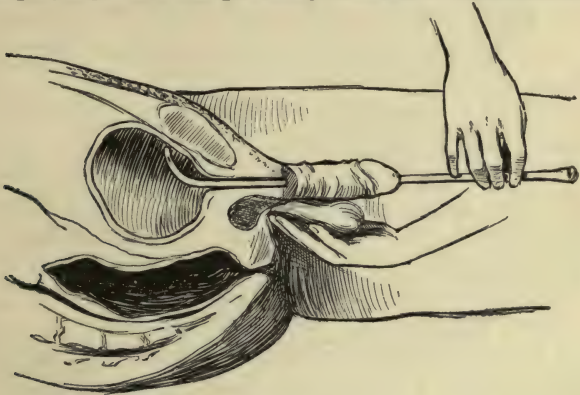


FIG. 70.

degree of skill in using it, and the surgeon will, in all probabilities, fail to pass the prostate with it. If the patient has never used the instrument, then it is

## REGIONAL MINOR SURGERY.

likely that an ordinary soft gum elastic catheter will suffice to evacuate the urine. Failing this, we must resort to stiffer instruments.

It is an exceedingly common mistake for the surgeon to believe that the smallest instruments will pass most readily. As a matter of fact, it is very usual for a surgeon to be called in to a case in which the family attendant has used a number of small instruments, and, to the surprise of the patient and the first practitioner, the consultant easily passes a large one. The reason for this is that there is no real stricture, but only an obstruction due to a body that is in the way, and around which it is possible to pass.

The elbowed and double-elbowed Mercier catheters are the most serviceable. In their absence a fair sized English woven catheter, with its stylet, may be bent in the *coudé* shape, and, if properly used, will often prove quite successful. It must be remembered here that the obstruction lies upon the floor of the urethra, and that the point of the instrument must be caused to pass above it. It is this which the elbow near the end of the prostatic catheter is expected to accomplish. As soon as the obstruction is encountered the penetration will stop, unless the obstacle has fortunately been overcome at the first trial. As the latter is by no means always exactly in the mesial line, the catheter, which has been introduced with the point pressing exactly in the middle line of the roof of the urethra, may be slightly rotated from side to side, with moderate pressure, until it slips beyond the prostate and into the bladder. When this maneuver is performed with a solid instrument, or a metallic catheter, the surgeon, remembering the necessity of keeping the point in contact with the upper wall of the urethra, often has a tendency to

## THE BLADDER.

depress unduly the handle of his instrument. While the handle must at some time be well lowered, it must not be done too soon, but only in obedience to a tendency the instrument gradually assumes toward the horizontal position, as it engages beyond the bulb into the prostatic part. If the slight lateral movements, already spoken of, fail to obtain a full penetration, with very moderate force, it is unjustifiable to unduly increase the force. The point has not been properly engaged, and the instrument must be withdrawn for an inch or so, and the procedure methodically repeated. If failure still follows, the surgeon must either select a different instrument, or, after emptying the bladder by suprapubic puncture, should decide to wait for a day before renewing his efforts. In the meantime the urine must be kept aseptic by internal treatment.

## REGIONAL MINOR SURGERY.

### THE RECTUM.

*Foreign Bodies.*—There may be impaction of foreign bodies within the rectum. These are either due to the fact that such a body may be swallowed, and, after passing through the digestive tract, partially penetrates some part of the rectal wall, and so remains attached to it, or else they are introduced from without.

Long sharp bodies, such as fish-bones, pins, etc., are those which most commonly become impacted after having been swallowed. They give rise to pain which is sometimes constant, and sometimes chiefly felt on defecation. A muco-purulent discharge is occasionally seen upon the fecal masses. Occasionally some blood is passed. These bodies may be detected with the finger, or they may be seen through a speculum. Their removal is commonly easy. In some cases a fish-bone or needle may entirely penetrate the rectal wall, and give rise to the formation of a local abscess. The writer has had one case in which a pin was removed on opening a peri-rectal abscess, and another in which a sharp spicula of bone lay in the middle of an ischio-rectal abscess.

Bodies introduced from without are often more difficult to deal with. They may be of all varieties and forms, and are inserted by the patient himself, owing to sexual perversion, or, at times by others, in some cases of atrocious assault. Smooth bodies may commonly be removed through a speculum. Rough



## THE RECTUM.

bodies generally call for complete anesthesia, thorough dilatation of the sphincter, and removal by various forms of forceps.

*Prolapse.*—Of this we have two varieties, anal and rectal. Prolapse of the anus occurs when the mucous membrane of the lower part of the rectum protrudes.

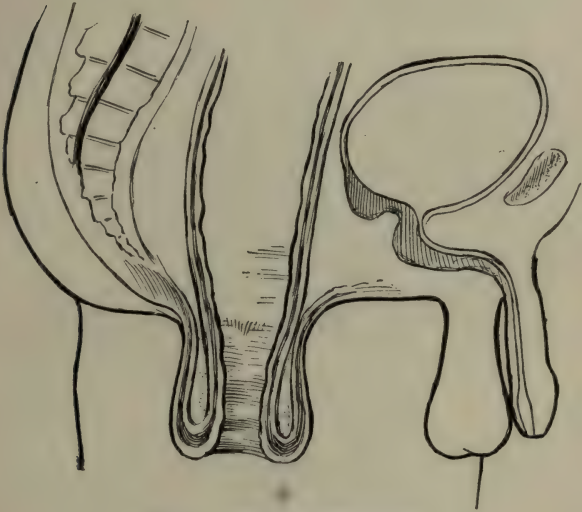


FIG. 71. Prolapse of the rectum.

It may be partial or complete. In anal prolapse the treatment consists in keeping the bowels free, and attending to the food if in young children. In the latter we most frequently see the disease affecting babies beginning to eat ordinary food, who become constipated chiefly owing to the deficient amount of fat in their diet. The buttocks in children may be strapped together with a wide band of adhesive plaster. In adults hygienic measures alone may not suffice.

## REGIONAL MINOR SURGERY.

If the protrusion is large portions may be excised, and the cut edges sutured, or else the actual cautery may be applied, burning five or six strips parallel with the direction of the bowel.

In the rectal prolapse the condition is practically one of intussusception, involving the upper part only, or serious enough to cause a protrusion of the bowel through the anus.

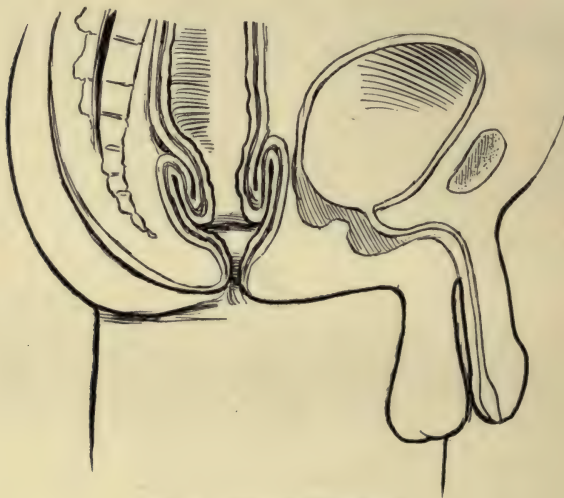


FIG. 72. Low intussusception.

In children replacement by slow, steady pressure, after thoroughly greasing the mass with vaseline, together with attention to diet and strapping the buttocks, may be sufficient. In bad cases the actual cautery is useful when the condition has a tendency to recur. If, as sometimes occurs, there is gangrene from prolonged compression, resection of the protruded and strangulated mass may be required.

## THE RECTUM.

*Stricture* may be due to traumatism resulting in cicatricial stenosis, to the healing of an ulcer, to syphilis, tuberculosis, or to one of the malignant diseases.

In cicatricial stenosis the passage of progressively larger bougies may suffice. In tubercular stenosis thorough dilatation and curetting under deep anæsthesia, followed by the use of iodoform, may effect a cure, but the prognosis is somewhat uncertain. In syphilitic stenosis dilatation is necessary, with anti-syphilitic treatment. Many of the latter cases, however, prove exceedingly rebellious, and the writer has had two cases in which, notwithstanding the most rigid care in dilating and in taking the usual iodo-mercurial treatment, the patients finally had to submit to left inguinal colotomy for the establishment of an artificial anus.

In the presence of malignant disease, none but operations belonging to the domain of major surgery can be of any avail.

*Hemorrhoids.*—These are external and internal. External hemorrhoids are either mere patches of thickened skin due to the former occurrence of hæmatomata, or else are acute attacks of the latter condition. The hypertrophied skin may be removed, generally, by nipping off with scissors, if it is troublesome. In acute piles, or hæmatoma, in which a clot forms under the skin at the muco-cutaneous border, the pain is often very violent. The recumbent posture, astringent ointments, and mild purgation often suffice to effect a subsidence of the trouble. This mode of treatment is not to be compared, for instant relief, with the rapid splitting down of the pile with a sharp knife. The clots are then turned out and the patient immediately feels better. When done

## REGIONAL MINOR SURGERY.

after a spray of chloride of ethyl, this little operation only gives slight pain, which is amply repaid by the relief of tension.

*Internal Hemorrhoids.*—The symptoms of internal hemorrhoids are pains during defecation, and sometimes also during the intervals. There may or may not be bleeding at stool. If the hemorrhoids become suddenly inflamed and congested, they may protrude

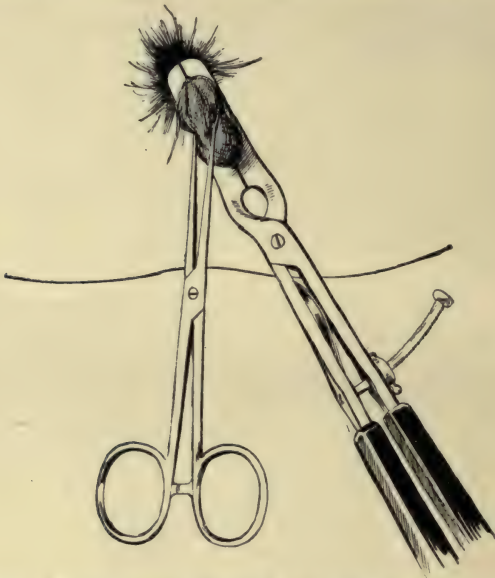


FIG. 73. The pile seized and ready to cut off before applying the cautery.

through the rectum, and there cause much tenesmus, which is only relieved by the return of the mass within the rectum. Palliative treatment consists in regulating the diet and procuring regular action of the bowels. Operative treatment, however, should



## THE RECTUM.

be adopted in all bad cases, and is eminently satisfactory.

*Ligation.*—Small piles may be ligated with strong catgut or silk, after the mucous membrane has been incised around the pedicle. After such a ligature has been placed, there is no advantage in leaving the pile to slough off. It is much better to remove it below the ligature with the scissors. If this operation is adopted for large piles it will be best to transfix the pedicle with a double ligature, which is tied so that each half of the thread encloses one-half of the pedicle.

The clamp and cautery operation is deservedly popular. After thorough dilatation of the sphincter with the thumbs, the piles are seized one by one with a pair of forceps, pulled tightly down, and the clamp is applied to the pedicle, the tumor itself protruding between the blades, the direction of which must always be parallel with the long axis of the bowel. The protruding pile is then snipped off with scissors, and the tissues remaining within the grasp of the blades are thoroughly seared with the cautery. The latter must only be raised to a dull red heat. A bright red heat hardly does more than cut through the tissues, and renders bleeding more probable. This operation is repeated for every pile.

In the case of large rings of piles surrounding the whole anal region, the writer prefers Whitehead's operation, with which he has obtained excellent results, and for which the reader is referred to books on major surgery or on rectal diseases.

In every operation for piles, the bowels are to be first thoroughly emptied, and the patient is then kept constipated for some days. The first dressing consists in a hooded rubber tube, in which a piece of gauze is tied around the tube so as to form a mantle covering

## REGIONAL MINOR SURGERY.

further dressings arranged in a conical shape. This should be thoroughly covered with vaseline and inserted part of the way in the rectum. The tube will provide for the escape of flatus, which otherwise may prove very distressing.

*Fissures.*—These are longitudinal solutions of continuity situated at the anal margin, and running up-

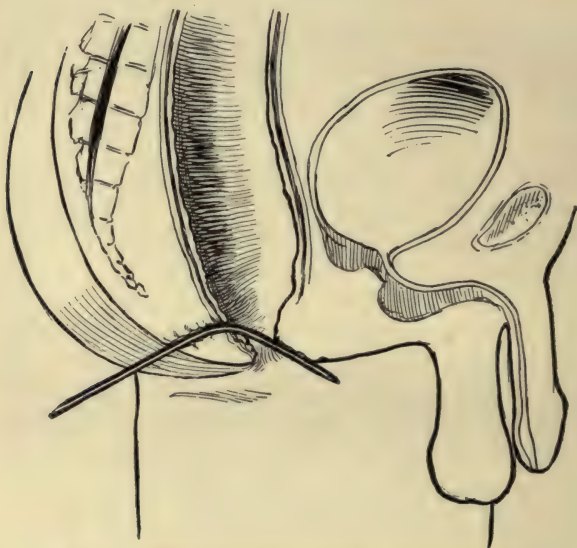


FIG. 74. Passing a probe through the fistulous tract.

wards over the sphincteric portion. They cause intense suffering, and are to be treated by thorough stretching under anæsthesia. If these fissures are deep it is sometimes advisable to cut down upon them, so as to divide some of the fibres of the sphincter.

*Fistula in Ano.*—This is always the result of the formation of a purulent focus in the peri-rectal tis-

## THE RECTUM.

sues. The original abscess may be cold or tubercular, or it may be an inflammatory collection, giving rise to the general symptoms of abscess elsewhere. When a fistula forms, it is either complete or incomplete. If complete, there is an opening near the peri-anal margin, through which a probe may, with a little skill and patience, be passed into the rectum, as an opening exists in the latter. When there is a rectal opening, the probe gives its general direction, and, by passing a finger in the rectum, a little teat, or protrusion of mucous membrane, commonly reveals the site of the opening. When incomplete the probe stops in a blind cul de sac.

*Treatment.*—The only remedial measure worth considering consists in laying open the fistulous tract by an incision carried from this tract through all intervening rectal tissues. A grooved director is passed through the fistula into the rectum. If the fistula is an incomplete or blind one, the probe must be pushed through into the rectum. The end of the probe can generally be brought out of the anus, and all tissues are then slit upon the director. The fistulous tract should then be thoroughly curetted with a small, sharp spoon.

This operation often results in a partial incontinence of flatus or feces, if the sphincter has to be entirely divided. Hence, in operations requiring extensive incision, the cut surfaces, after thorough curetting, are usually joined together by a series of sutures placed on a plan similar to that adopted in women for lacerated perineum.

*Ischio-rectal Abscess.*—Abscess of the ischio-rectal fossa occurs as a result of infection from without, and following traumatism, or as a result of urinary infil-

## REGIONAL MINOR SURGERY.

tration, or because of some bacterial infection conveyed through the circulation.

When allowed to open spontaneously, they may find a passage through the rectal walls or, more frequently, through the cutaneous surfaces lying over this region.

The first symptom is pain, due to distention, which tends to increase. There is hardness and redness over the ischio-rectal region. Fluctuation can be obtained only at a later period, owing to the depth at which the suppurative focus usually lies.

Any evidence of deep inflammation in the ischio-rectal region is an indication for immediate operation. Poulticing, etc., is only a means of securing greater destruction of the tissues, and is, therefore, unjustifiable. The incision must be ample to secure perfect drainage, and the abscess cavity must be thoroughly cleaned out and allowed to fill up by granulation from the bottom.

In cases in which the opening has been long delayed, fistulous tracts are likely to remain. This is still more true of cases that have opened spontaneously.



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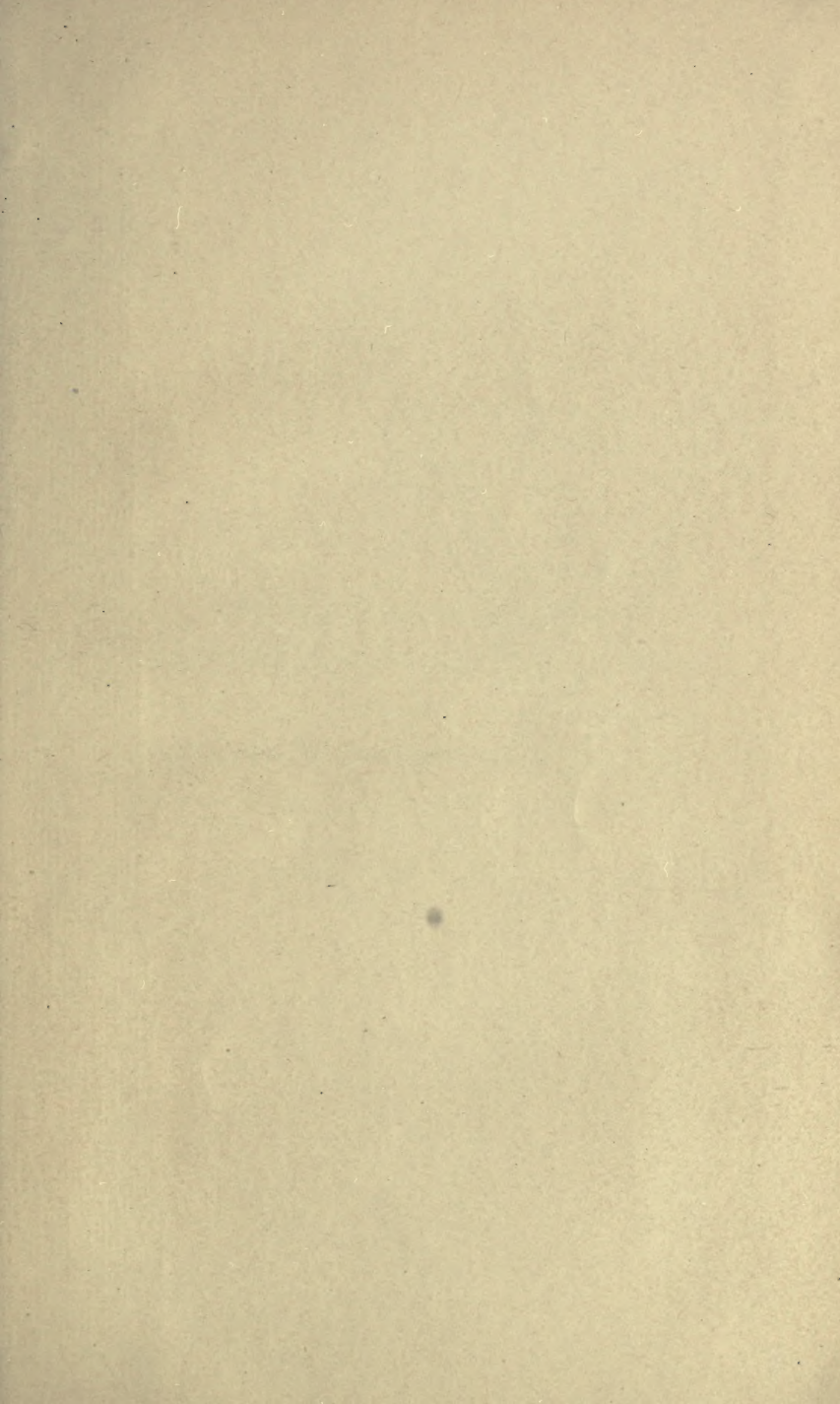
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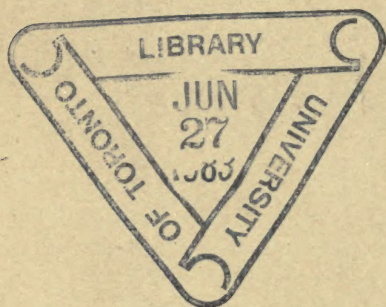
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